The Builder.

No. CCCCLXIX.

SATURDAY, JANUARY 31, 1852.

GENTLE Reader, as the novelists formerly called you,—hoping by "blarney" to propitiate,—we are about to ring gently a few changes on BELLS:—

> "The bells and chimes of Motherland,
> Of England green and old,
> That out from grey and ivied tower
> A thousand years have tolled."

It will not be a *peal*, for this in strictness means a performance of not less than 5,000 changes, but simply what is known as "a short touch:" nor shall we deal with bob-triples, bob-majors, or grandsire-bob-cators,—with the dodges called "hunting," and "snapping," or any of the other worse than Eleusinian mysteries of those well-known unknowns the College Youths, who have figured on belfry tablets for these last two or three hundred years, and had their name, it seems, from meeting to practice at St. Michael's, on College-hill, London. This church, by the way, was rebuilt by that redoubtable hero of the nursery who was brought back to London by the bells, which seemed to say to him:—

> "Turn again, Whittington,
> Thrice Lord Mayor of London."

He was buried here too, and it is just possible, we may suggest, that the story had something to do with the meeting together of this most ancient society of ringers, the aforesaid College Youths. It is not, however, of their art and doings, or of the out-of-place pranks of some of their followers and imitators that we would deal, but rather with the Bell itself; the story it tells, its founding, and its hanging. There are few of true metal themselves who can listen to the outbreaking bells without emotion. What wonder is it, then, that so many poets, giving utterance to these feelings, should have sung of the bells,—Schiller singing longest and loftiest? Longfellow, the last, makes his Friar at Strasburg cease his discourse when the bells begin to chime:—

> "For the bells themselves are the best of preachers;
> Their brazen lips are learned teachers,
> From their pulpits of stone, in the upper air,
> Sounding aloft, without crack or flaw,
> Shriller than trumpets under the Law,
> Now a sermon and now a prayer.
> The clangorous hammer is the tongue,
> This way, that way, beaten and swung,
> From mouth of brass, as from Mouth of Gold,
> May be taught the Testaments, New and Old.
> And above it the great cross beam of wood
> Representeth the Holy Rood,
> Upon which, like the bell, our hopes are hung.
> And the wheel wherewith it is swayed and rung
> Is the mind of man, that round and round
> Sways, and maketh the tongue to sound!
> And the rope, with its twisted cordage three,
> Denoteth the Scriptural Trinity
> Of Morals, and Symbols, and History;
> And the upward and downward motions show
> That we touch upon matters high and low."

What say the old couplets, though in another tongue,—

> "I praise the true God, call the people, convene the clergy,
> I mourn the dead, dispel the pestilence, and grace festivals."

"Lightning and thunder I break asunder," is often part of the motto inscribed on them. And on others we find, simpler and more touching,—"we rejoice with the joyful, we grieve with the sorrowful:" or, better still as it stands in the bells' own tongue,—bells have always spoken Latin,—

> "Gaudemus gaudentibus,
> Dolemus dolentibus."

The great antiquity of bells is undoubted, but the date of their introduction is unknown. The instruction in *Exodus* that there should be a golden bell and a pomegranate alternately on the priest's garments, will be remembered. The Greeks and the Romans used them. In the sixth century, at all events, they were in use for the Christian church. They were variously called Signum (showing connection with a signal), Campana, and Nola (because a Bishop of *Nola*, in *Campania*, is supposed by some, on slight grounds, to have first introduced them to Italy; though others say because they were made of Campanian brass), *Tintinnabulum* (from the sound they give?), and Codon. The Curfew bell, and the marriage bell, and the passing bell, have their own associations, and tell their own story. Bells are blessed, if not baptised, by the Roman Catholic Church,—with the desire anciently to render them effectual in driving away evil spirits. According to the Rev. A. Gatty, in a pleasant and comprehensive little book, called "The Bell,"* "It is not very clear when this custom began; some say under Pope John XIII. (A.D. 970): but it must have prevailed long before his time, as in the capitulars of Charlemagne (A.D. 789), the baptism of bells is distinctly forbidden,—"*ut clocæ non baptizentur.*" Some years ago, in one of our continental rambles, we were present at the consecration of a bell at Bayeux, in Normandy, and have elsewhere described the occurrence.† The bell was suspended from a scaffold on the east side of the tower, near it was a temporary altar, and around it priests, vergers, chorister-boys, with robes, and crosses, and lanterns: about a hundred females composed the assembly. Prayers were read, the bell was sprinkled, anointed, and fumigated twice; a napkin was tied round the clapper, and its name was declared to be *Clementine*.

We gave, a short time since, the weights of some of the principal bells, and need not now repeat the enumeration. None of them come near the King of Bells, in Russia, the weight of which is said to be 443,772 lbs. The diameter of it is 22 feet 5 inches. It seems that it was fractured in the casting, and remained nearly two centuries partially buried in its mother pit. It is now placed in view, and is perhaps more useful (failure though it be) as giving an impulse to mind, than it would have been, if put out of sight to perform its real office. To "raise it," as the ringers call the first movement for ringing, would have been almost impossible.

Amongst the largest bells of the present time is the great bell at Montreal, which was cast in 1847, by Messrs. Mears, of Whitechapel. This is 8 feet 7 inches in diameter at the mouth, 8 feet 1 inch high, to the top of the crown, and weighs 30,800 lbs. This same firm cast "Great Peter of York," which weighs 26,800 lbs., also the new "Tom o' Lincoln," and such a startling list of ordinary church bells, that we have been led to analyse it, and find it embraces 11 peals of 12 bells, 27 of 10 bells, 172 of 8 bells, 260 of 6 bells, 73 of 5 bells, and about 190,000 single *tintinnabula!* A tolerable evidence, in itself, of the extent of modern churchbuilding. We journeyed to Whitechapel the other day, to see a set of bells cast, intended for Port Phillip, Melbourne. Everything was ready for the operation. In the furnace there were nearly six tons of molten metal, a sea of fire when stirred by the men, consisting of copper and tin in certain proportions. The moulds were in their places, and the "gutters" formed. While the men are sweeping the burning embers out of the latter, placed there to heat them, so that the metal may receive no chill, we will tell you something of the previous arrangements.

The inner mould, or core, of the bell is built up of brickwork, having a hollow left in the centre of it for a fire, and the face of this core is covered with a composition of clay and other materials, and moulded into the shape of the *inside* of the bell. It is then baked by means of the fire in the hollow, and when hard, is coated with another composition, which is made to take the exact shape of the *outside* of the bell, and is also hardened by the fire; after which the inscriptions and any desired ornaments are placed upon it in relief. Over this the outer mould, or "cope," is formed, and the whole having been burnt, the cope is taken off, and the inner thickness of composition, representing the bell, is removed; so that when the cope is again put over the core, there is, of course, a space between the two, of the shape and thickness of the bell, and into this the metal is allowed to run. One necessary precaution is to leave a hole in the cap of the mould, besides the orifice through which the metal runs, to allow the air to escape: the omission of this would be fatal to the process. For large bells the formation of the mould takes place in a pit dug in the ground near the furnace, but the moulds of smaller size are formed in the workshops and placed afterwards in holes dug for the purpose. When in the pit the earth is rammed firmly round it, leaving nothing exposed but the holes in the cap, and from these a channel, technically called a "gutter," is cut to the mouth of the furnace. When a number of bells are to be cast at the same time, various gutters are formed from the furnace-mouth, and a metal spade, called a "slice," is used to cut off the communications between the gutters and the various moulds. When the first mould is seen to be full, the slice is withdrawn, and the metal is allowed to flow into the next, and so on.

The moment was now come, the metal was of the right proportions (tried by occasional *assays*) and the right temperature, almost as important, and the men took a final glance around to see that the whole was correct. As Schiller says:—

> "Is it in the ground well bedded?
> Is the mould well set and steadied?
> Skill and diligence to pay
> Will it issue fair to-day?
> Should the cast not hit—
> Should the coping split!
> Ah, perhaps, while hope elates us,
> Now—e'en now—mishap awaits us!"

But in Mears' foundry, it seems, mishap is never dreamt of: two or three blows with a point, at the clay-stopped hole in the furnace-mouth, and out rushes a vivid streak of fire, bubbles along the gutter and pours into the first mould:—

> "Smoking where the gutter bows
> Fierce in fiery waves it flows."

When the red metal bubbles up through the

* The Bell: its Origin, History, and Uses. Published by George Bell, Fleet-street.
† The Churches of London, vol. II.

air-hole the slice is withdrawn and the stream passes on to make the next bell. Long may they hang to summon in a distant land our fellow-men to holy teaching.

About twenty-four hours suffice to cool an ordinary bell sufficiently to allow of the removal of the earth around it: the mould is then broken off with small hatchets, and the bell is removed to the shops to be tuned by means of the "turning machine." When a set of bells turn out to be in harmony, without tuning, they are called a "maiden peal," but this does not often happen.

Something might usefully be said of the mode of hanging bells, the "cage," as it is called, and the wheels, but this we must defer. Reference has been made in our pages to the present disgraceful state of many belfries, and it is high time that the churchwardens looked to them, and set them in order. In some that we have seen lately, pigeons and other birds have provided all the materials for producing spontaneous combustion. The Rev. Henry Ellacombe, who, like a refined Quasimodo, hangs about his bells with affection, has urged the necessity of reform in the conduct of the ringers, too, and has drawn up a set of rules with that end in view.* The Reverend writer points out a method by which,—

> "To call the folk to church in time,
> One little boy six bells can chime."

This may be effected either by heavy hammers to strike outside on the "*bridge*" of the bells, like those of a clock; or, by fixing light hammers or balls, proportioned in size, and in length of lever, to each bell, and so arranged to work on an axis as to strike on the inside—just where the clapper strikes,—and when not in use, to drop down, so as to be quite clear of the swing of the bell when rung. A cord, or "*sash line*," fastened at the end of the lever, may be guided by pulleys to a given point in the church, where the ends are tied, when used, to a fixed horizontal bar.

A set of brisk able ringers at work is an interesting scene, and if you tumble up still higher, you will see a sight you will not soon forget: the bells, dancing and whirling, and banging and clashing, produce a stunning and bewildering effect on the strongest nerves: we tried it once and intend never to do so again. Charles Lamb calls bells "the music nighest bordering on heaven;" but it is not every one who lives near a church who thinks so; and ringers will do well, therefore, to use their privileges with judgment, or they may hear something closely resembling a French verse, which Mr. Gatty translates into,—

> "Disturbers of the human race,
> Your bells are always ringing;
> I wish the ropes were round your necks,
> And you upon them swinging."

And for fear you, the aforesaid gentle reader, should think that our clapper has run long enough, we, too, will finish our "touch," and tie up the ropes for to-day.

A New Patent Material.—The Earl of Dundonald has obtained a patent for "improvements" in sewers, drains, &c., and for making columns and vases. The substance patented is *bitumen* of various kinds, according to circumstances. The pipes are to be cast with one side flat. The patentee proposes to use it for concrete, also for foundations under water.

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* Practical Remarks on Belfries and Ringers. George Bell, London. 1850.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

In his second Lecture, on the 15th instant, Professor Cockerell proceeded to illustrate the principles laid down in the preceding lecture. He observed that most works on the history of architecture began by tracing to their origin, in the tent, the hut, and the wigwam, the temples of Greece and Rome, and all the other masterpieces of architecture. On this point he would only say, that the building art was coeval with man's first appearance upon the earth: his habitation was, indeed, inseparable from his existence, and as essential as the hive to the bee, or the hut to the beaver. Milton had described the bower constructed by our first parents in Paradise; whilst the city built by Cain, with Noah's ark, and the Tower of Babel, furnished proofs of the antiquity of that art which was, indeed, a portion of the natural history of man.

Next to the roof and walls, the first elements of architectural construction were the pillar and the impost, which, by natural steps, became, in after times, the shaft, the capital, and the entablature. These types assumed the form of the mere post and beam in woody countries; but where that material was scarce, sun-dried or kiln-burnt bricks were employed.

The observation of the forms of nature led to the improvement of the column, to its gradual and graceful diminution, and to the use of *entasis*. The same study of nature, aided by the curves derived from the conic sections, enabled the Greeks to invent their admirable mouldings; the ovola, the ogee, and the cymatium. The Romans, on the contrary, were satisfied, as engineers, with those curves and profiles which could be produced by the compass, and neglected the conic sections. The latter were the true source of the beautiful, and furnished the elements of that quality alike in the details of Greek, Gothic, Saracenic, and Chinese architecture.

The elements of architecture were of the simplest kind; the column, with its entablature, forming the classic order; and the architect who possessed the three orders—Doric, Ionic, and Corinthian—with the arch, was, in fact, fully furnished with his stock in trade. These materials might be compared with the letters of the alphabet; and only mind was wanting to enable the architect to achieve with the former like wonders as those which Homer and Shakspeare had accomplished with the latter. The architect had no right to lament the paucity of his materials: all that was needed was poetic thought and happy invention.

The lecturer proceeded to consider the elements of lines, to which the architect is required to give language and expression. By the horizontal and perpendicular lines mankind were furnished with standards whereby to reconcile the greatest confusion; and they afforded types by which the sublime in architecture had been sought,—in a hilly country by the former, and in a flat country by the latter. The first sight of the sea, after travelling over an undulating country, illustrated the agreeable effect of the horizontal line. Under these circumstances, the landsmen confessed the majesty of Neptune, and admitted his sublimity; and the enthusiasm displayed by the Ten Thousand, in their famous retreat under Xenophon, at the first sight of the sea, might be ascribed not merely to the prospect of a speedy return to their beloved homes, but in part to the natural effect of the sublime horizontal line of the ocean. In hilly and romantic Greece, the long level line of its temples, with their regularly ordered colonnades, furnished repose to the eye, and admirably contrasted with the flowing lines of the accompanying landscape. And where the straight lines of Greek architecture were broken, as they were in some of the works of the Adamses, the effect was consequently bad. In flat countries the perpendicular line was naturally adopted in architectural compositions on the same principle.

The beauty of the straight line was keenly appreciated by the Greeks; and it was still to be traced by the adoption in our own language of the words *orthodox*, *orthography*, &c., shewing that the straight, the level, and the upright were the *correct* in morals as well as in art. Contrast was an important source of the beautiful, and the rules referred to would supply a useful guide to the architect in adapting his design to its site.

The diagonal line was a natural source of delight in its various angles with the horizontal and the perpendicular. Right angles were always avoided by engravers, who produced their sweetest effects by the more obtusely angular lines. The general and continuous admiration of the pyramid and the pediment sufficiently proved the attraction of diagonal lines, and it might be seen also by their prevalence in the sculpture accompanying Greek architecture, the effect of which was much enhanced by its contrast with the straight lines of the architecture. So carefully indeed did the Greeks avoid placing in conjunction with their architecture any perp ndicular or horizontal line in the sculpture, that they appear to have had an utter abhorrence of the parallelism which must ensue. This feeling was especially manifested in Phigalian sculptures, as well as in those of Halicarnassus and the Budrum Mausoleum.

In proceeding to consider architectural forms in plan and elevation, it might be observed that a square was a better form of plan for a tower, than a parallelogram. A square house, on the contrary, was stigmatised as a box; and dwellings with more propriety assumed, like the Greek temples, the form of a parallelogram. A tower which took the form of a parallelogram in plan was altogether a solecism, as might be illustrated by reference to the tower of the New Church in the Strand, by Gibbs. The disagreeable effect, and indeed the deformity, of the tower of that church, so far as its plan was concerned, was only to be seen as approaching it from Drury-lane. If it had been so placed as to have been viewed at an angle, it must have created a public scandal, and long since have been altered; but its peculiar position was, no doubt, duly considered by the architect, who accordingly spread out the tower so as to increase the effect, as viewed from the Strand, and felt it unnecessary to give it a corresponding depth.

The plan of the Roman temples was a double cube: those of the Greeks were rather more. That ordinarily adopted for the plan of modern churches, namely, a parallelogram of 2 by 3, or 60 feet by 90, had a very unpleasant effect internally,—as might be seen in St. James's Church, Piccadilly,—showing the necessity of a clerestory to restore its tasteful proportion. The proportion of 3 by 2, or 36 feet by 24, was an admired proportion for internal apartments in the best houses of this country; but 5 by 3, or 40 feet by 24, was, in his opinion, much more effective. The latter was recommended by Palladio, whose rules on this subject, as well as those of Vitruvius and Alberti, might be studied with advantage.

The triangular form might be characterized as the root of Gothic architecture, not only from its frequent employment emblematically, as the symbol of the Trinity, but from its geometrical combinations. Regarding the square form in its application to Greek architecture, and the triangular to Gothic, they might be likened to the four-legged and the three-legged stool; and, apart from any partiality or prejudice for or against either style of architecture, it must be acknowledged that the Gothic—the acute or triangular—must be ever meagre and unsatisfactory in its effect, compared with the Greek, of which the square form might be regarded as the basis. In triangular forms there must be absolute light contrasted with absolute darkness; whereas, in square or circular compositions, an exquisite gradation of middle tents was obtained. In the circular form this was especially manifested. The Colosseum and the Pantheon, the Crescent at Bath, the Castle of St. Angelo, the column in all its varieties, the rainbow-arch of the bridge, and the vaulted ceiling, were alike wonders of structure, of strength, suavity of form, gradation of light and shade, and beauty of effect from every point of view.

The apparent diminution of circular forms to the eye, unless seen from a distance, made their requisite proportions a matter of serious consideration; and in buildings of circular

plan, it appeared that the less their elevation, the better was their effect; that their proportion should be rather that of the single or double Gloucester, than of the Stilton cheese. This was proved by the proportions of the Pantheon, and the Castle of St. Angelo.

In treating of the spiral line—the offspring of the circle—the lecturer adverted to the beauty of the fossil relic known as the *Cornua Ammonis*, which, if it had been a work of art, discovered amongst the ruins of Greece or Nineveh, would have been the theme of general admiration, but, as a natural production, was altogether disregarded. Again, adverting to the graceful lines derived from the conic sections, he referred to the statement of Tacitus, that the goddess Venus was worshipped in Cyprus, under the form of the cone said to have fallen from Olympus,—as if the worshippers of beauty had recognised its principal element in that form.

The next point to be considered was the combination of rectilinear and curvilinear lines, both in the plans of buildings and in their mouldings. This combination was not adopted either by the Greeks or the Egyptians, but it was conspicuous in the plans of Roman buildings, as might be seen in several basilicas, in the temple of Mars Ultor, and in the palace of Augustus, as restored by Canina. The same principle, applied to external architecture, was carried to a great extent by Borromini and Bernini, and by it much grace of composition, with a great variety of light and shade, were attained. In its general application to exterior elevations this combination was a modern innovation; but it constituted the soul of beauty in the composition and contour of Greek mouldings. Hogarth's "line of beauty" was identical with the profile of the Greek cymatium: and the great charm of other antique mouldings was derived from the tasteful opposition and combination of the round, the angular, and the square.

Mr. Cockerell illustrated the grace and delicacy of the great mouldings by referring to some well-executed casts; and proceeded to contrast them with the coarseness and rudeness of those of the Romans. The angularity and acuteness of the latter, with their vulgar energy, as compared with the Grecian specimens, were forcibly elucidated. The Romans, he observed, concealed their want of art by an abundance of ornament. This was manifested in the arch of Septimus Severus; which justified the assertion of Tacitus, that from the time of that emperor the art of architecture had lost its majesty. The still further degeneration of art subsequently was shewn by reference to the mouldings of the Palace of Diocletian, at Spalatro; and the lecturer urged upon the attention of the students the opinions so well expressed on Greek and Roman mouldings, in Wood's "Letters of an Architect." He further illustrated the subject and its analogy with natural forms, by diagrams of the human profile; shewing that the existence therein of outlines similar to those of the best Grecian mouldings, conveyed a highly intellectual expression of countenance; whereas their absence produced only an ugly and sensual expression.

It was necessary to guard the students against the seductions of archæology; whereby they were too likely to be led to admire and imitate the deteriorated productions of the Lower Empire. It was proved by history that architecture and public morals declined simultaneously. Indeed it would be obvious to any philosophic student, by comparing the history of the age of Augustus with that of Justinian, that the architectural works of the former period must of necessity be elevated, and those of the latter debased. In this respect the architect might be regarded as himself the historian of his times. Obvious as this truth was, it was necessary to guard the student against the meretricious graces of Spalatro, Baalbec, and Palmyra, and the Byzantine works described by D'Agincourt. These, though worthy of careful study, should be subjected by the student to severe and rigid criticism. In common with all kinds of inferior productions, these works had been repeatedly engraved of late years; and in fact few ancient edifices had not been so illustrated; every author and publisher being an enthusiast in reference to his own works. Great care, therefore, was necessary to distinguish the corn from the chaff, and it was much to be desired that an age of sound and judicious criticism should follow the present era of immense production.

Having pointed out the skill and taste which the Greeks displayed in adapting the superficial ornamentation of their mouldings to the forms of these members, and the neglect of such matters of detail by the Romans, the lecturer proceeded to notice the three Grecian orders, premising that architectural practice in England must be limited to Greek, Roman, and Gothic architecture, excluding, as impracticable here, the Egyptian, Assyrian, and other ancient forms.

The Doric order, he observed, had never yet had a fair chance in England. It was difficult to associate its horizontal lines successfully with the general surface of the country; and only in such situations as Edinburgh and other elevated spots could it be properly employed. Vitruvius had overlooked one important feature of the Doric order, namely, the steps forming its stylobate. These, in the best classic examples, were of considerable height; the actual ascent to the temple being by lower and subsidiary steps. To place a Greek column, therefore, on a 6-inch step, was a gross solecism. In the main steps, likewise, the Greeks introduced a sinking in each riser, so as to form a nosing, which gave its due effect of shade to every step; and but for this expedient the steps would have presented the appearance of an unbroken mass of light when the sun shone full upon them. The great size of the stones employed was another main feature of the ancient Doric, as shown in the ruins of Pœstum, Selinus, Corinth, &c. In modern imitations, therefore, the column should, if possible, always be a monolith, and the architrave in single stones.

The difference between the Ionic of Ionia and that of Greece Proper, with the superior beauty of the former, was next explained, together with the leading features of the Corinthian order. In conclusion, the Professor observed that, whilst admiring these beautiful examples of masonic architecture, on which all their associations of the beautiful were founded, it was essential that they should not overlook the new element, the Iron order, which science had lately brought into notice. The student would do well to turn his attention to the means of imparting, by analogy with nature, that beauty which it was capable of receiving, to the Iron order, on which he hoped to offer some remarks on a future occasion.

THE RIVER TERRACES FOR LONDON.

ALTHOUGH the grand scheme for forming continuous lines of terrace along the Middlesex *strand* of the Thames—say, between Vauxhall-bridge and London-bridge,—which has so long engaged the attention of John Martin and the public, bears little promise of being carried into effect, seeing the multitude of interests that are involved, and the great cost that would attend the carrying out an undertaking of such magnitude, it does not follow, all the while, that portions, such as offered as the most eligible, should not be effected from time to time. Now, if there is one portion more than another which could be executed with facility, and would be attended with advantages to those most immediately interested, far more than commensurate to the expenditure, it is that lying between Adelphi-terrace and the north end of Waterloo-bridge. Here, the line of direction is free of main buildings; and the relative levels of the shore, terrace, and bridge, are such, that the low-lying premises on the first would be cleared by a terrace carried over them. The circumstances at this place are such as suggest a mode of construction in which cast-iron would obviously play a prominent part,—columns—arch-girders—binders—joists, and a platform of Rockhill (*i. e.* Caithness) or Valentia flags, not omitting semitransparent but substantial flags of glass: such platforms can now with ease be made waterproof by a system of skeleton framing affording solid bearings to every joint, these packed with elastic material saturated with red or white lead, and the flags flush-screwed. Such an opening next the river becomes very desirable in connection with the improvements at the west side of Somerset House-buildings; while it would be no inconsiderable convenience, so far as the westward approach to, or egress from, Waterloo-bridge is concerned. To the proprietors, also, of the aforesaid low-lying premises on the shore that would be spanned over, improved communication with the Strand and Waterloo-bridge level would become available, by means of open, spiral, or other stairs opening on the terrace; and, generally, an enhancement in value of the properties in contact with it might be anticipated. We throw out the hint to those whom it may concern, and shall be glad to find the seed germinate.

IRELAND AND HER BOGS, AND HOW TO USE THEM.

IT is a gratifying and singular fact that the districts of the sister kingdom which are at present considered as the most worthless seem ordained to be, at a not very distant period, a mine of wealth to their fortunate proprietors. Unlike mines in general, too, we find here the object of our wish may be wrung from mother-earth by labourers rejoicing in the genial sunshine, and invigorated by the nature of their toil.

The actual extent of bog-land reclaimable in Ireland alone amounts to 3,000,000 acres. And as the weary traveller surveys on every side, as far as the eye can reach, the dull brown tints which indicate the nature of these wildernesses, the idea must naturally suggest itself to his mind that it is a truth that nothing is devoid of purpose if we can but discover its applicability; and it appears we are now upon the eve of being assured that the dreary bogs, in which vegetation seems so long to have slumbered, are to become the sources of abundant and general reproduction. In more than one part of this hitherto much neglected country may be observed the manufactories for converting the peat or turf into charcoal, the virtue of which, whether as a deodorant, a medium of rapid filtration, a fuel, a vehicle for transforming the contents of sewers and cesspools into a most valuable and inoffensive manure, cannot be overrated, and to be duly appreciated must be seen in operation. It is true that various demonstrations of the uses of this material have been made, and numerous publications issued on the subject, and yet we find the general public either totally ignorant of its merits, or sceptical on the subject of its vast importance to society. Foremost amongst the depôts for the manufacture of this article in Ireland we find the extensive stations of the Irish Amelioration Society, in Kildare, providing employment, at remunerative wages, to a vast number of the willing peasantry, who are giving daily proof that it is labour alone the Irish seek, and not alms. We have also the works of Messrs. Gwynne and Hays, in the county Kerry, who have commenced trade largely in drying and compressing peat for fuel, for home use and for exportation, as it is considered far preferable to coal for steam-boilers, engines, &c. There are also many private manufacturers in different parts of the country, giving much occupation to the poor people, who are always grateful for being afforded the means of self-support, as their employers invariably testify.

We have heard repeatedly of the practicability of extracting spermaceti, naphtha, tar, &c. from this humble Cinderella of the great organic family, and that such may be done at a cost to amply repay parties who judiciously employ their capital in producing the same we have no reason to doubt.

In a recent experiment, made in the presence of two professional friends, I had the satisfaction of finding that the gas produced from the compressed peat burnt freely a considerable time with a clear steady flame, in every way similar to the carburetted hydrogen, or common coal gas, but evidently more brilliant, probably owing to the absence of sulphur in the peat, while it abounds so largely in the

coal. May not advantage of this material, therefore, be taken for lighting economically towns situate in the neighbourhood of the peat districts?—or, indeed, since means have been found for compressing the turf almost to the density of coal, an export trade in the commodity may be hoped for.

Even from the rushes which abound so luxuriantly in bogs and other marshes, a beautiful fabric may be woven; and some dressed specimens prepared for weaving which I lately saw in the possession of a foreigner, appeared to possess all the strength of the best flax, with the rich gloss of silk.

While on the subject of the uses to which peat may be applied, allow me to say that the nature and origin of the vast tracts of waste, both in this country and throughout the entire of Europe, to which we have given the term bog in general, ought to be a matter of peculiar interest, whether to the geologist or botanist; and, from careful observations, made in numerous sections of those of Ireland, on the classification, position, and structure of the various trees, plants, shrubs, &c., found therein, and comparing the same with the brown coal common in many parts of Germany, containing timber in so perfect a state as to serve for the manufacture of various articles of household furniture, I have every reason to conclude that what we now term peat bogs are simply the younger formations of immense coal-fields, awaiting only volcanic influence to entomb the mass, which, when submitted to intense pressure, the action of sulphur jets, and other mineral productions, aided by the agency of time, the mysterious revealer of events, may become the great basis of the wealth of the commercial world, coal.

Thus, after the lapse of ages, another revolution awaits the buried elements of nature, for the requirements of man compel him to dive deep into the bowels of the earth for the treasure he neglected while upon its surface. By combustion he may change the form and quality of the exhumed mineral, but destruction he cannot effect—the gases liberated by fire hasten to perfect new and wonderful combinations—obeying the fiat of the omnipotent Creator—"increase and multiply." The new system of drying the turf (which at present is but little understood) by means of constant currents of air at a moderate temperature evenly sustained by a simple and economical application of heat, is answering well. It is now generally admitted, that in a humid climate, to depend upon atmospheric drying alone is at least precarious, if not wholly unprofitable, when the operations become extensive. CHARLES GEOGHEGAN.

*** An improvement in the mode of burning the peat into charcoal is much needed: the patented kilns are eminently defective. We have seen the drawings of a kiln devised for the purpose by Mr. Geoghegan, the writer of the above communication, which seems to have great advantages, and ought, we think, to come into use. The great value and importance of the material is only beginning to be understood.—ED.

GREEK AND ROMAN ANTIQUITIES.*

THERE was long wanting in our language a correct and ample dictionary of Greek and Roman antiquities: we had out-grown *Adam's Account of the Manners and Customs of the Romans*; and beyond this there was nothing to be found in a connected form. It was reserved for Dr. Smith to produce a work which gives a perfect knowledge of "That city of the Cæsars, the mistress of the world," and of its teacher State, which, having checked the westward progress of Asiatic dominion, and given to the universe faultless models in every species of literature and art, was eventually compelled to succumb to the prowess of its rival's arms. It is too late now to point out that Dr. Smith has produced, by careful examination of original authority, with such aids as could be derived from the best modern writers—making the results of present day research available for the purpose of instruction—a standard work, containing the most extensive information on the highly interesting and important subject of which it treats. We may say, however, that the second edition now before us contains so many additions and improvements, that it must be regarded to a considerable extent as a new work.

Opening the volume, to give our readers an idea of the system adopted by the learned Doctor and his able coadjutors, we fall on the word *paries* (τοῖχος), the wall of a house, in contradistinction to *murus* (τεῖχος), the wall of a city, a fortification-wall, in fact.

Among the various methods employed by the ancients in constructing walls we find first spoken of the *Paries cratitius*, or wattled wall, made of canes or hurdles covered with clay, of which, in the original Roman city, entire houses were formed. Mention is also made of dried lumps of clay built into walls, strengthened by means of horizontal bond timber; and in districts where wood abounded, log-houses were common, constructed after the fashion of those at present in the back settlements of America,—trunks of trees partially squared, piled one on the other, the interstices being filled with either moss or clay. But these were, as civilisation advanced, succeeded by the use of brick or stone; this latter, either in the shape of irregular masonry, the wall being built of stones, which were not squared or cut into any exact form, or as the *emplecton* or complicated wall, consisting in fact of three walls joined together, each side presenting regular masonry; the interior being filled with rubble; the two outside shells rendered firm and durable by large stones or courses of brickwork extending at intervals through the whole structure.

Vitruvius tells us the mode universally adopted in his time was the *reticulata structura*, resembling network. It consisted in placing square or lozenge-shaped stones side by side upon their edges, the stones being of small dimensions and cemented by mortar. Walls thus constructed were considered more pleasing to the eye, but less substantial than those in which the stones lay flat. The front of the wall was the only part in which the structure was regular, or the stones cut into a certain form; the interior being rubble work or stone chippings imbedded in mortar. Only part of the wall was reticulated: to give it firmness and durability the sides and base were built of brick or squared stones, and horizontal courses of bricks were laid at intervals, extending through the length and thickness of the wall. In many cases the mortar has proved more durable than the stone, especially where volcanic tufa is the material employed, as at Baiae, in the Bay of Naples, and in the Villa of Hadrian, near Tivoli.

Annexed (Fig. 1) is an engraving of a wall of this sort from the drawing of a wall at Pompeii by Mr. Mocatta.

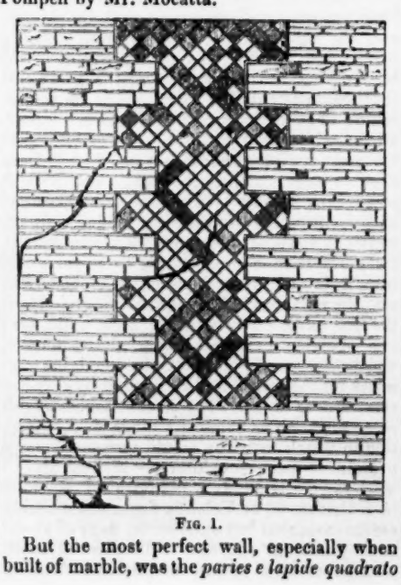


FIG. 1.

But the most perfect wall, especially when built of marble, was the *paries e lapide quadrato* or ashlar wall, consisting entirely of stones cut and squared by the chisel. The construction of such was carried to the highest perfection by the architects of Greece; the temples of Athens, Corinth, and many cities of Asia Minor still attesting in their ruins the extreme skill bestowed on their erection. Considerable excellence in this art must have been attained by the Greeks even as early as the age of Homer, who derives one of his similes from the "nicely fitted stones" of the wall of a house. But probably in this the Greeks only copied the Asiatics, for Xenophon came to a deserted city in Mesopotamia, the brick walls of which were capped by a parapet of "polished shell marble."

The accompanying cut (fig. 2) shows to what an extent the Romans introduced arches in their buildings, not only where openings were needed, but where they could serve no other use than to strengthen the wall. It represents a portion of the supposed *Thermæ* at Trêves.

FIG. 2.

Walls were adorned, especially in the interior of buildings, in a great variety of ways. However coarse and rough their construction might be, unevenness was removed by a coating of plaster with rough cast, consisting of sand, together with stone, brick, and marble, broken and ground to various degrees of fineness. Gypsum, also, in the state which we call plaster of Paris, was much used in the more splendid edifices, decorated with an endless variety of tasteful devices, in bas-relief or fresco. Another method of decorating walls was by encrusting them with slabs of marble—an art of high antiquity, probably in its origin Oriental. The brick walls of the Mausoleum at Halicarnassus were covered with slabs of Proconnesian marble; and this is the most ancient example upon record.

Mausoleum being our last word of any import, we turn to the page in our dictionary where we may expect to find it: we are there told that the original building was the production of the piety of a wealthy queen, and of the skill of the great artists of the later Ionian and Attic schools of architecture and sculpture. Mausolus, the Dynast of Carea, having died B.C. 353, his queen Artemisia evinced her sorrow by observing his funeral rites with the most expensive splendour, and by commencing the erection of a sepulchral monument to him at Halicarnassus, which should surpass anything the world had yet seen. Pliny is the only writer who gives anything like a complete description of the edifice; but even in this account there are considerable difficulties. The building, he tells us, extended 63 feet from north to south, being shorter on the fronts, and its whole circuit was 411 feet (or, according to the Bamberg MS., 440 feet): it rose to the height of 25 cubits (37½ feet) and was surrounded by thirty-six columns. This part of the building was called *Pteron*. It was adorned with sculptures in relief, on its eastern face by Icopas, on its northern by Bryaxis, on the southern by Timotheus, and on the western by Leochares. Above this *pteron* was a pyramid equal to it in height, diminishing by twenty-four steps to its summit, which was surmounted by the marble quadriga made by Pythis. The total height, including this ornament, was 140 feet. The only way of accounting for the discrepancy

* Dictionary of Greek and Roman Antiquities. Edited by Wm. Smith, LL.D. Second edition, published by Taylor, Walton, and Maberly, Upper Gower-street, and Ivy-lane, Paternoster-row; and John Murray, Albemarle-street.

between the total and relative heights being the supposition that the whole was elevated on a basement; the other apparent discrepancy between the lengths of the sides and fronts and the total circuit of the building can only be satisfactorily explained by supposing that it stood within an enclosure, or upon a platform of the larger dimensions, viz., 440 feet in perimeter. When we come to the details of the arrangement of the parts, we find most writers giving the simple explanation, which most readers of Pliny would probably adopt at first sight, that the thirty-six columns formed a single peristyle all round the building. To this view there are very formidable objections, and another, which has not only the merit of being exceedingly ingenious, but the authority of an accomplished architect, is proposed by Mr. Cockerell in Mr. Newton's Essay in the *Classical Museum*. Taking, on the one hand, Pliny's 63 feet as the length of the longer side of the peristyle, and, on the other hand, calculating the dimensions of the order from the existing fragments of the frieze, (which in the case of a work of that period of Greek art an architect can do with much certainty), Mr. Cockerell arrives at the conclusion that the thirty-six pillars were arranged in a single row of six columns on each front, and in a double row of eight on each side, at intercolumniations of 6 feet 8 inches, around a long narrow *cella*, corresponding in length to six of the columns of the peristyle, and in width to two. The researches of the latest travellers furnish a strong hope that good elements for reconstructing the plan of the Mausoleum may be found among the fragments of columns which are about the city of Budrum, or are worked into its walls, either when it was built by the knights of Rhodes in the fifteenth century, or when they strengthened its fortifications in 1522. In most ruins we behold what Time has spared; but ancient Rome appears to have defied him. In its present remains we see the limbs which he has rent and scattered in the struggle. Sir Stratford Canning obtained permission from the Porte to remove from the inner wall of that fortress *some of the sculptured slabs which had formed its frieze*, and in February 1846 they were taken down, conveyed to England, and are now deposited in the British Museum under the name of the *Budrum* Marbles. In the Roman Mausolea, as the term was afterwards used by them as a generic name for any magnificent sepulchral edifice, the form chiefly employed was that of a succession of terraces, in imitation of the *rogus*. Of these the most celebrated were those of Augustus and Hadrian; the latter of which, stripped of its ornaments, still forms the fortress of Modern Rome (the Castle of St. Angelo); but of the other, which was on a still larger scale, and which was considered one of the most magnificent buildings of Augustus, there are only some insignificant ruins.

This naturally induced us to turn our attention to *Time*, as it may be well to inquire how the division of that "old enemy" was regulated. We shall find the subject treated under the headings *Hora* and *Horologium*, the last being the name, as our readers know, of the various instruments by means of which was measured the time of the day and night. The first horologium known seems to have been the sun-dial, called by the Romans *solarium*, and by the Greeks γνώμων; but as these were found to be of no service unless the sun shone, they were superseded by the clepsydra, deriving its name from κλέπτειν and ὕδωρ, as in its original and simple form it consisted of a vessel with several little openings at the bottom, through which the water contained in it escaped. Several improvements were made on the original system, but all these were excelled by the ingenious invention of Ctesibius, a celebrated mathematician of Alexandria. It is described by Vitruvius: water is made to drop upon wheels, which were thereby turned: the regular movement of these wheels was communicated to a small statue, which, gradually rising, pointed with a little stick to the hours marked on a pillar which was attached to the mechanism. It indicated the hours regularly throughout the year, but requiring to be often attended to and regulated, did not come into general use, being found only in the houses of the wealthy, the sun-dial or gnomon, and a simpler kind of clepsydra, being used to a very late period. There is still existing, though in ruins, a horological building, which is one of the most interesting monuments at Athens. It is the structure formerly called *The Tower of the Winds*, but now known as the *Horological Monument of Andronicus Cyrrhestes*.

FIG. 3.

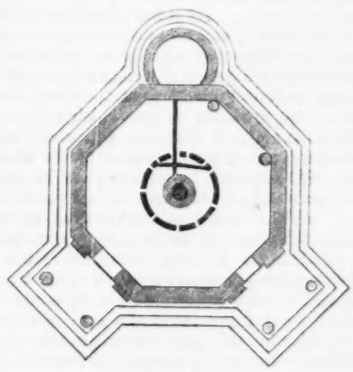


FIG. 4.

This building is fully described by Vitruvius, and our engravings 3 and 4 show its elevation and ground plan, as restored by Stuart. The turret in south wall contained the cistern which supplied water to the clepsydra.

There is so much in this volume to interest our readers, including valuable disquisitions on the baths, the temples, amphitheatres, aqueducts, &c., of the ancients, that we shall make another dip into it, and will only say, in the meantime, that it will be found a mine of knowledge, and will make a small library in which it is placed equal to many a large collection without it.

INSECURE BALCONIES.—In your last week's number two serious accidents are mentioned as having occurred very recently from the falling of balconies. No practical man who is in the habit of walking about the suburbs can have failed to remark the generally insecure state of the balconies to third and fourth-rate houses, the only marvel being that accidents do not more frequently occur. This glaring evil may be, however, very easily and inexpensively obviated by invariably securing balconies with ornamental cast-iron cantilevers running through the whole thickness of the wall, and pinned in: they may be obtained in a great variety of patterns at any of our large iron warehouses, and the additional cost accruing from their use would not in ordinary cases exceed 5*l.* per house.—E. M.

ON SKYLINES.*

THE influence of architecture on the nation by which it is fostered, and the impressions which even the various component parts of it make upon the spectator, can scarcely be estimated: that it is great, no one can deny, and we possess a glorious privilege to plant upon the land we love, o'er the grave of buried years, emblematical monuments of their worth and their civilization, to form the connecting link, more truthful than the written page, between the buried past and the historian of the veiled future,—to mould the subject-matter for the strains of future poets. But to ensure such tributes to our art, it must be rendered worthy of them. Resolutely must we labour, fervently and religiously ponder on all which constitutes its greatness. The measureless compass of our study must nothing daunt us. *Sans peur* we must be, if we would be *sans reproche*. The materials of which beauty is built up must be thoroughly comprehended. Each of the outworks must be mastered ere we attempt the holy citadel. There must be no leaps over rapids we cannot breast, but all must be gained by a persevering course, and the print of each onward step must be garnered in our minds.

Outline, colour, harmony, unity, expression, fitness, are all worthy our attention and our contemplation; but the foundation of all beauty is undoubtedly FORM. Even this is capable of being again subdivided into the general grouping of the building and its relationship to adjacent objects; the composition of its several parts, and the outline of its detail. I shall, on the present occasion, offer a few remarks upon the form of the highest points of a building—the skyline, as it is called—where it stands distinctly forth against the over-arching firmament, where no broad shadow nor dazzling light can, as on a wall, cast a deepening veil upon its form.

It is immaterial what the subject be: whether church, conventicle, warehouse, or an ivied cottage, the skyline of a design cannot escape the spectator's eye: the architect, so long as he preserves the fitness of the parts and the character of the building, has the whole realm of form before him to make his work harmonious and striking. It is not the shadows which fall behind the porticoes of the classic temples, depicting their columns in sharp outline and the boldness of their projection: it is not the long lines of their cornices, so harmonious with the broad outstretching desert and the line of the distant main, which Byron marked when standing beneath the portico of Pallas's fane: it is not these which give them grandeur, though certainly aiding in the work; but the beauteous, gently sloping, reposing lines which stand forth in silent beauty from the deep azure of the cloudless eastern sky. The sky in these sunny climes is generally one unbroken calm—

> "Where not a breath disturbs the air serene,—
> Where not a cloud throughout th' expanse is seen;"—

consequently, as a general rule, the skyline of their buildings is unbroken, and the contrast is formed by the simple outline of the structure. * * * *

Leaving the lands of cloudless skies and sandy plains, it must be evident to all, that where the sky is continually varying, where pillowy clouds float through the air "as on their way to some celestial show," without any tokens of discipline, a very different treatment must be pursued in determining the skyline of our buildings. The fitful changes of our northern skies are communicated to the landscape. They and it suit one another, and man has best succeeded in his buildings where he has shown his comprehension of nature's wisdom, and given irregularity to the crowning feature of his work. I need not remind you, and yet they are illustrative of our subject, of the marvellous effect visible, through an observance of this principle, in the works of the mediæval builders, in their cathedrals and abbeys, and even in the old timber houses still existing both in England and on the con-

* From a paper read at a meeting of the Architectural Association.

tinent. It is not for any beauty of detail that the latter are admired and selected by painters for sketches. They are generally deficient in this requisite, being, for the most part, built of rough carpentry and plaster. Where any carving is to be seen, it is of the rudest description; yet these structures have a wonderful effect upon the naturally active and restless northern mind, standing out prominently from the irregularity of the cloudy sky.

Regularity would never so affect us: the eye, as Reynolds says, would be perplexed and fatigued through not knowing where to rest, where to find the principal action; and where all were making equal pretensions to notice, all would be in equal danger of neglect. I do not need to be told that these excellencies in the old timber buildings are dispersed, and that the beautiful skyline is accidental, and often the crowning feature of a mass of rubbish and discomfort; but when these old picturesque places lie near our path, it is well we should know that something may be gleaned from them which, reborn, would reflect credit upon its producers.

If likewise, from some prominent position, we look down on our modern towns, the irregularity caused by the spires of the churches and the various public buildings, is the secret of their charm; nor is it lessened, because those which pierce the smoke of our modern London are not designed to suit the fashion and the assumptions of the day: indeed, I would point to two of the Pagan churches (as they have been called) for one of the triumphs of our art with respect to the arrangement of the skyline in harmonious contrast one with the other:—I allude to the church on Ludgate-hill and St. Paul's, as seen from any part of Fleet-street. It is a panorama of surpassing beauty. Each sets the other off, yet each is equally successful. Notice, for instance, how the thin elegant spire in the church gives dignity to the cathedral, and *vice versa*; and how, to preserve harmony, the form of the *small* cupolas in the cathedral is repeated in the church at the *bottom* of the spire.

I would that I could speak favourably of the general skylines of our modern streets, but alas! what with unbroken surmounting cornices, copings on plain brick walls, and high zinc smoke pipes of all imaginable forms, excepting only those which approach the beautiful, there is little skyline to admire. I know not why we stick so pertinaciously to the invariable parapet gutter, one of the principal causes of the unsightliness of the skylines in our streets. It likewise astonishes me that we can scarcely build a chimney without necessitating the use of those abominable things I have just mentioned. First, with respect to the gutters, there is no question about their being the worst and dearest. With a steeper roof and eaves gutters there is greater protection from the weather; there is no snow stoppage in winter, no deluge in summer.

The zinc smoke-pipes cast a shadow upon our scientific knowledge, and disfigure the finest building. Look, for example, at the effect of them on Somerset and Marlborough Houses.

A chimney flue is generally too small to be an important feature, and yet it *must* go above the roof. We must get over this apparent difficulty by grouping the flues into stacks, according to our taste and judgment, and to peculiar circumstance, in order to support the general effect of the building.

Were these two evils—parapets and zinc flue-tops—remedied, an architect would have, even in our streets, abundant materials to crown, with a good skyline, the beauty of his building. The effect of the modern continental streets is far more picturesque than those of England, through the liberal use of the dormer, which follows the adoption of a high-pitch roof to the building; and, I may add, incidentally, the colour which they give to their external plaster.

But we must not suppose that the materials of beauty are alone sufficient, and that a good skyline will result as a matter of course; neither should we imagine that a facility in creating beautiful parts will gain success in the skylines of street architecture. We must, in addition to that, possess knowledge, judgment, and feeling, if we would create aggregate beauty resulting from the skilful arrangement of delightful forms, harmonious in themselves, in harmonious contrast with all around. We must so arrange different parts that they shall adorn one another. Now what principle should govern us in determining our skyline? I answer, the same as nature has adopted in suiting the landscape to the sky: we have exactly the same background of ever-changing clouds. We cannot imitate her perfectly, but we can investigate her principles and profit by such a course, and this will lead us to irregularity of lines and irregularity of surface.

Of all the means which an architect may adopt in the collocation of minor parts or in the arrangement of the roofs, to effect a pleasing skyline, that must undoubtedly be the best which arises out of the construction of the work, and which is most likely to give effect to the principal feature, and which is unencumbered with foreign useless ornament, which everything must be that does not co-operate to the general appearance. Every part should be placed in the best available situation so as to support properly the principal feature. Intention should govern every line, and nothing be left to chance. We must likewise consider in buildings of any extent the propriety of introducing secondary and tertiary groups complete in themselves, but contributing to the primary feature. This principle is admirably carried out by Vanbrugh in Blenheim and Castle Howard. He is one of the most celebrated architects of England for skylines and painters' effects.

You will thus perceive that the whole subject must be completely realised in the architect's mind ere he attempts to give it outward form and shape. He must penetrate to the complete depths, and enclose the entire compass of his subject, expanding or redisposing any necessary adjunct if it be an obstacle to the elucidation of his idea, at the same time judiciously subduing aught which interferes with the success of his work, and which may have arisen out of the necessities of the structure. He will have likewise to bear in mind the character and sentiment of his substructure: whether the sentiment desired be the simple, the grand, or the picturesque; whether it stand upon a lofty eminence robed in mighty winds; or whether with as loud a roar the wild waves bend before its base,—the chief aim in the arrangement of the skyline should be to dispose the parts in the manner best calculated to express the desired sentiment,—so to form his skyline that in the fertility of his imagination he does not banish harmony from his design. W. BOUTCHER.

DISCOVERIES IN ST. OLAVE'S CHURCH, CHICHESTER.

SOME interesting discoveries have lately been made in clearing out St. Olave's Church, Chichester, with a view to its restoration. On removing the floor of the chancel, to which there was an ascent of several steps, a circular arch was brought to light in the eastern wall. Both the material and structure of this arch are remarkable. The materials with which the arch is turned are large Roman tiles of almost 18 inches in length and 2 inches in thickness. As to its construction, instead of the usual truncated wedges or voussoirs closely fitted to each other, it has only the flat tiles aforesaid, placed at intervals of an inch or more from each other, and compacted together by a thick layer of mortar: neither do the tiles radiate or point to the centre, but are piled rudely almost parallel to each other. The masonry of the wall in other parts of the building is also of Roman tiles of a smaller size, mixed with rough stone. A local correspondent writes to us,—"In all these respects the structure exactly corresponds with that of the very ancient church of Brixworth, in Northamptonshire, which, on documentary evidence, is referred to the date 670—700, A.D. The probability of this being about the correct date in the present instance also is greatly confirmed by the consideration that it was in A. D. 680, that St. Wilfred founded the bishopric of this diocese at Selsey, having received a grant of land from Ceadwalla, king of the West Saxons. A church, therefore, might very well have been built here at the date specified, and very probably was, as Chichester had been a post of importance from the time of the Romans. These views, if correct, will place this humble church at the head of all in the diocese, and of all but one or two in the kingdom in point of antiquity.

The church was rebuilt at its present raised level in about 1310, and an elegant piscina has been discovered in the north wall of the nave, also one in the south wall; the former apparently from the same hand as the Chapel of St. Mary's Hospital, in Chichester. A second archway of depressed form, occurring in the north side of the chancel, and at the same low level as that in the eastern wall already described, has also been found to contain Roman tiles of great size and thickness, laid flatly over the stone voussoirs of the arch.

In the south wall of the nave of the present church, and at the present level (which is many feet above the level of the arches we have hitherto been speaking of) has been found, by still more recent examination, a very narrow doorway, circular headed, and perfectly plain, formed of a fine chalk stone, and in the most perfect preservation. A small cross, incised in the interior of the eastern jamb, marks doubtless the spot at which it was touched with chrism, or oil, at the consecration of the church. There can be no doubt but this doorway is also Saxon, though from the great difference of construction, and especially from the far higher finish of the work, it must be referred to a period many years subsequent to that of the rude remains which the undercript of the chancel exhibits, most probably to a period shortly anterior to the Norman Conquest. St. Olave, Olaf, or Olaus, King of Norway, came over about 1014 to assist Ethelred against the Danes; and on his being canonized after his death, in 1028, churches were, out of gratitude, built in his honour in London (Tooley-street takes its name from St. Olaus), and elsewhere, most probably before the date of the Conquest, 1066, since the Saxons, and not the Normans, owed St. Olave a debt of gratitude. We may conjecture that this arch is a relic of the church as rebuilt by the Saxons, and dedicated to St. Olave.

Thus we have in this single spot, if the above deductions from the date be correct, three successive arches; one at the old Roman level, of the date of 680 or 700, A.D.—some think even earlier; a second at the present level, at about 1040 or 1060; and a third at the date 1310 or 1320. The church is now in course of restoration, and a subscription has been set on foot for the purpose, and from the well-known liberality of the inhabitants of this ancient city, we should judge the work will be well carried out."

THE OPERATIVE ENGINEERS AND THEIR EMPLOYERS.

THE committee of associated masters have issued, under the signature of their secretary Mr. Sidney Smith, a representation of their view of the unhappy difference with their workmen. "All we want," they say, "is to be let alone. With less than that we shall not be satisfied. Until we accomplish that, we shall not re-open our establishments." We question the prudence, though not the motive, of one remark made in this "representation," viz., "we claim, and are resolved to assert the right of every British subject, *to do what we like with our own*, and to vindicate the title of our workmen to the same constitutional privilege." Considering the various equivocal senses in which "doing what we like with our own," has been applied and understood, we think it is a pity such a phrase appears in a question between masters and their "own" workmen, as a handle may be made of it wherewith to work out ends and views not contemplated when it was written. On the subject of the systematic abolition of overtime it is said, with a truth in which for our own parts we personally and feelingly sympathise,—"All classes, in nearly every avocation, have occasionally to

work overtime,—the Prime Minister, perhaps, the most,—the successful physician, or the great lawyer the most slavishly. But men of any merit voluntarily set the task to themselves; those of the mechanic class earnestly desire it; and so far is either that or piece-[illegible] from being regarded as an oppression, our experience as masters is, that in the eye of mechanics as a body, it is viewed as a positive objection to an establishment that it does not afford opportunity for working overtime. The real objection to piece-work, we fear is, that it protects the masters against those who are indisposed to give a fair day's work for a fair day's wages." As we have already remarked, the men demand of their masters in this last respect what associated workmen (in Paris) have discovered that they cannot honestly allow to each other. The result of these unhappy differences must be serious loss to both parties and to the country at large, and more serious the longer reconciliation is delayed. The position taken on either side, does not justify a hope of a speedy arrangement: we wish we could aid in effecting it. The tone of the masters' pamphlet is, we fear, not calculated to do so.

NOTES IN THE PROVINCES.

Leigh-de-la-Mere, Wilts.—At the village church of Leigh-de-la-Mere, built at the expense of Joseph Neeld, Esq., a *Lich Gate* has been put up under the direction of Mr. Thomson. It is of English oak, wrought and framed together in a substantial manner, and varnished to exhibit the rich colour of the wood. The roof is close boarded with oak placed lengthwise, and tiled with stone tiles. The application of the Lich Gate was suggested to Mr. Neeld, we understand, by our publication of an example of one some time since.

Claydon.—During the last six months a great portion of the parish church has been rebuilt. The former chancel, which was in a very dilapidated state, was taken down, as was also a portion of the nave, to allow of an enlargement by the erection of a transept. The rebuilding of the chancel, according to a contemporary, was undertaken by an amateur. The transept was built from a design by Mr. R. M. Phipson, architect. At the intersections with the nave and chancel are four moulded arches. Above is a groined roof of wood. The windows towards the north and south have flowing tracery. In the north and south compartments there is a waggon roof, divided into square panels, the intersections being ornamented with bosses. The nave is fitted up with open seats, which are unappropriated: the transept at present is not furnished. The roof and benches are the work of Mr. Ringham, whose son, Mr. W. Ringham, undertook the sculpture of the stone corbels. The ancient portion of the church contains some evidences of a Saxon date. At each of the western angles of the nave is an example of long and short work. The south door in the interior exhibits the same mode of building.

Wellington.—The contracts for the waterworks at Wellington were let on the 14th, at prices within the estimate of Mr. Marten, the engineer to the company. Messrs. Dickson, M'Kenzie and Co. of Oaken-gates, have taken the contracts for the reservoir and pipe-laying; Messrs. Cochrane and Co. of Dudley, for the pipes; and Mr. Edward Blakemore, of Wednesbury, for the cocks. The works are to be commenced forthwith, and will be completed, it is expected, in about four months.

Milford Haven.—The estimated cost of constructing and completing the intended wet docks and floating basin at Milford Haven is 100,000*l.*

Bangor.—The survey of the borough by Mr. Johnson having been examined and approved of by Mr. H. Austin and the General Board of Health, the local board have appointed Mr. Johnson, their surveyor, to carry out the drainage of the town, and superintend the details, the plan to be submitted to the general board within one month.

Easton.—A painted window has recently been erected in the nave of St. Mark's Church, Easton. It is the gift of Mr. H. F. St. John, who, it is said, has studied the art of painting in glass under Mr. Bell, with a view solely to the extension of the art to sacred purposes. The window referred to represents the Baptism of our Lord. Mr. St. John has contributed several other windows of less elaborate character to this church.

Birmingham.—It is a gratifying proof of the appreciation of art by the working classes, that the Exhibition of Paintings at the Society of Artists' Rooms, has, since the reduction of the charge of admission, been visited by nearly five thousand persons. The Exhibition is announced to close on Saturday, the 31st inst.—*Aris's Gazette.*——A stained window has recently been inserted in the chancel of St. Martin's Church, in place of the unsightly and inappropriate one formerly over the altar. It is the production of Messrs. Chance, of the Spinlane Works, and has been provided by a fund subscribed some time ago for the purpose. The window is of three lights, with a head filled with flowing tracery. No figures have been introduced into the design, and but very few symbols, the principal one being the *Agnus Dei* in the head of the centre light. The remaining portion of the centre and the whole of the side lights are composed of medallions containing geometrical designs, and surrounded by scroll-work and floriated tracery. Each light is separated from the mullion by a narrow band of a deep blue colour; and the prevailing colours employed in the whole window are blue, green, orange, and ruby. The tracery of the head is composed of trefoils, quatrefoils, and conventional modifications of the *Vesica Piscis*, some of which contain scrolls, and others the open Bible, the Sacred Monogram, the Eucharistic chalice, the Cross, and the emblems of the Holy Trinity.

Liverpool.—An inquest was held on Thursday week on James Foulis, aged 44, a joiner, in the employ of Furniss and Kilpin, at St. George's Hall. That morning, about seven o'clock, the deceased left his work to go to a water-closet, and not returning before eight o'clock, a search was made for him, when he was found lying dead at the bottom of one of Dr. Reid's ventilating shafts. He must have fallen a height of 20 feet. Mr. Hughes, clerk of the works, said that, on Friday, the key had been taken from his office for the purpose of measuring the door and frame: the key had been returned into its usual place, and he never knew that the door had been left unlocked until he heard that the deceased had been found dead. The jury returned a verdict of accidental death, but made a presentment that they "considered the place in question as exceedingly dangerous; and that a watchman ought to have been in attendance to prevent danger." It was stated in the coroner's court by one of the men employed in St. George's Hall, that this is the ninth person who has been killed in that building.

Cockermouth.—The Consistory Court of Richmond, Yorkshire, have decided that Mr. Clarke's design is to be carried out.

HOLLOW BRICKS.

"THERE is nothing new under the sun," was the observation of Solomon. If you remember, it was stated that it was intended by the Bey to send over specimens of hollow bricks, at the present time in constant requisition in Tunis, for the Great Exhibition; but the interest of such a contribution was at the last moment accidentally overlooked.

In the Museum of the Bath Scientific Institution, specimens of hollow bricks used by the Romans, and dug up within a short distance of the spot where they are now deposited, may be seen by any party interested. They are double the size of those used by Messrs. Bazely and Co., and are cemented together by *genuine Roman cement*. And, no doubt, a machine like our modern ones for making them was also used by the Romans. It would be interesting to test the strength of these bricks, and of the cement that unites them, as compared with the modern manufacture. In Bengal, the floors of Bungalows are usually constructed with earthenware pots, commonly called "Kedgeree pots," turned over, with their orifices on the ground. Charcoal is filled between the interstices, and a coat of brick concrete is laid on the top, thus forming a perfectly dry floor. What a comfort would floors of hollow brick prove to the kitchens or cellars in some of our damp localities. H. W.

BIRMINGHAM NEW WORKHOUSE.

OUR engraving represents the large workhouse which has been erected for Birmingham, under the direction of Mr. J. J. Bateman, architect, who appears to have provided for the town a very creditable structure. The building will be opened for occupation in March next.

Accommodation is provided for 700 adults, including officers and tramps, 600 children, and an infirmary for 310. The principal features of the design are the isolation of each from the other, of the workhouse, the infirmary, the tramp department, and the asylum for the children, and of the perfect separation of the classes in each department. The asylum for the children has every accommodation for their maintenance and education, with a view to promoting habits of industry and self-reliance in their future career.

The cooking for the whole of the establishment is performed in one central kitchen. One entrance only is provided to the buildings for the better control of ingress and egress to and from the establishment.

The main building, comprising the workhouse department, has an open corridor throughout, 10 feet wide, and open from the second floor to the roof, with iron galleries at each floor, for supervision by the officers only. This arrangement gives great facility for effective ventilation, and inspection.

The chapel is fitted up with open seats, and two small galleries in the transepts for children.

By private subscription of the guardians, the officers of the workhouse, and the contractors, three stained glass windows (by Messrs. Chance), from Winchester examples, have been placed in the chancel and aisles. The chancel window contains, in the five principal lights, figures of the Saviour and four Evangelists, with canopies and pedestals, and symbols in the ten upper lights. The two aisle windows contain four scriptural subjects of almsgiving. Two other one-light windows have been presented by Messrs. Chance, of the Baptism and Preaching of St. John. The remaining aisle and transept windows have been filled with stained flower quarries by the architect. Mr. Minton has presented encaustic tiles for the chancel, and the architect has given Minton's tiles for the aisles and nave.

The whole of the building works have been very creditably performed by Mr. Glenn, of Liverpool-road, London.

The cold water is supplied from a well by an engine to a tank, containing 30,000 gallons, placed above the ridges of the building, and a reserve of 10,000 gallons from the ordinary supply is always retained in the tank for the supply of the fire-mains, which extend throughout the buildings. The drains are flushed from this tank.

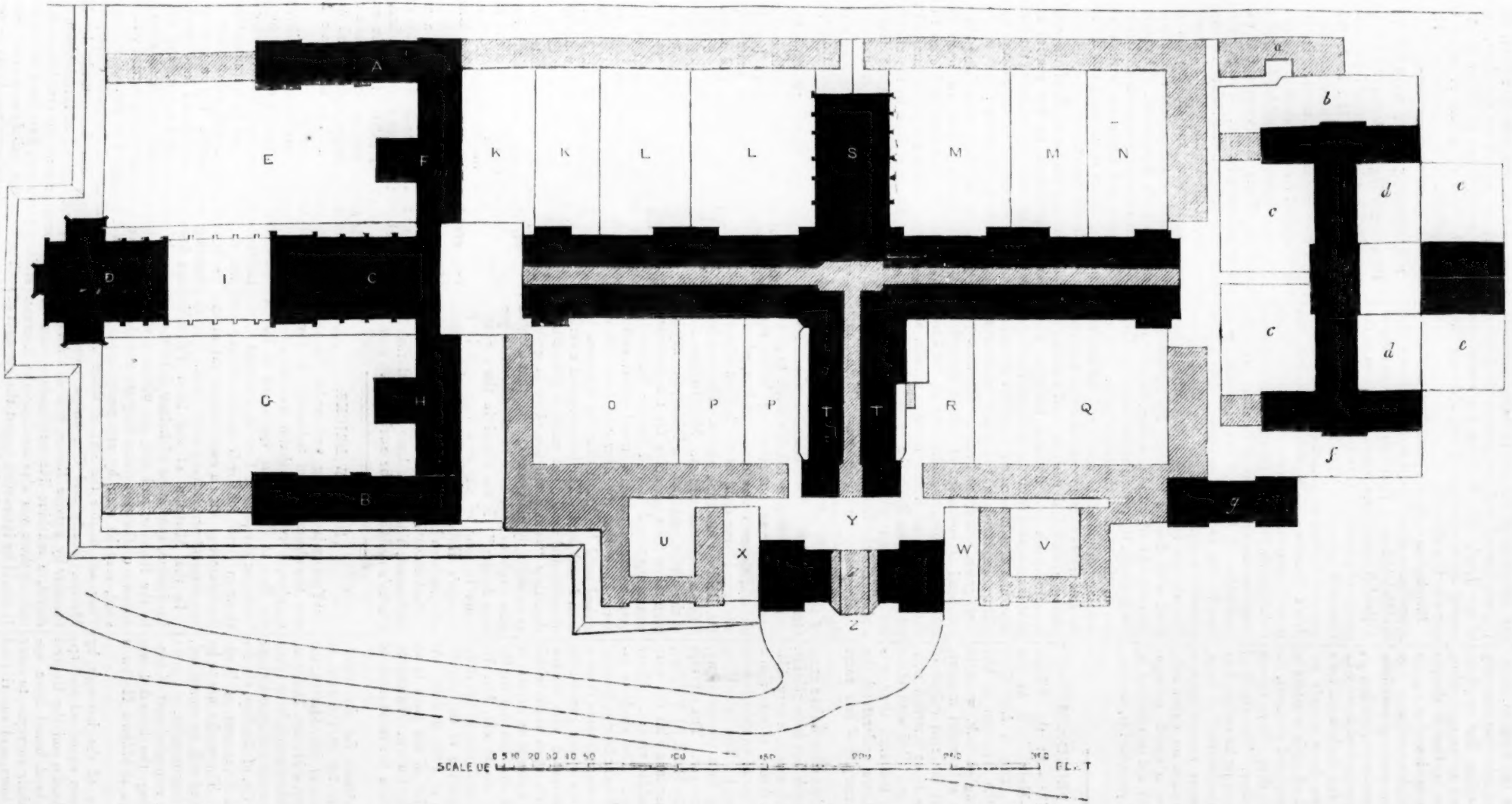
From a high-pressure steam-boiler, placed in a central situation, hot supplies for baths, lavatories, hospital, wash-house, drying-house, kitchen, sculleries, and for warming the infirm wards, dining-hall, and other parts of the building, are obtained. The engineering work has been ably constructed and applied by Mr. W. Jeakes, of London, and the comprehensive centralization of the heating powers has been very successfully carried out. Every room will be lighted by gas.

The furniture, of design to correspond with the building, has been made by Messrs. Jenkins and Ashford, of Birmingham.

The arrangements for ventilation, and other sanitary provisions, have been well spoken of.

The buildings include an area of above five acres, and liberal accommodation is provided for 1,610 inmates. The cost of the building amounts to about 29,000*l.*, exclusive of fixtures, furniture, and fittings.

PLAN OF BIRMINGHAM WORKHOUSE.



A Master's House
B Mistress's House
C Dining-hall, &c,
D Chapel
E Boys
F School

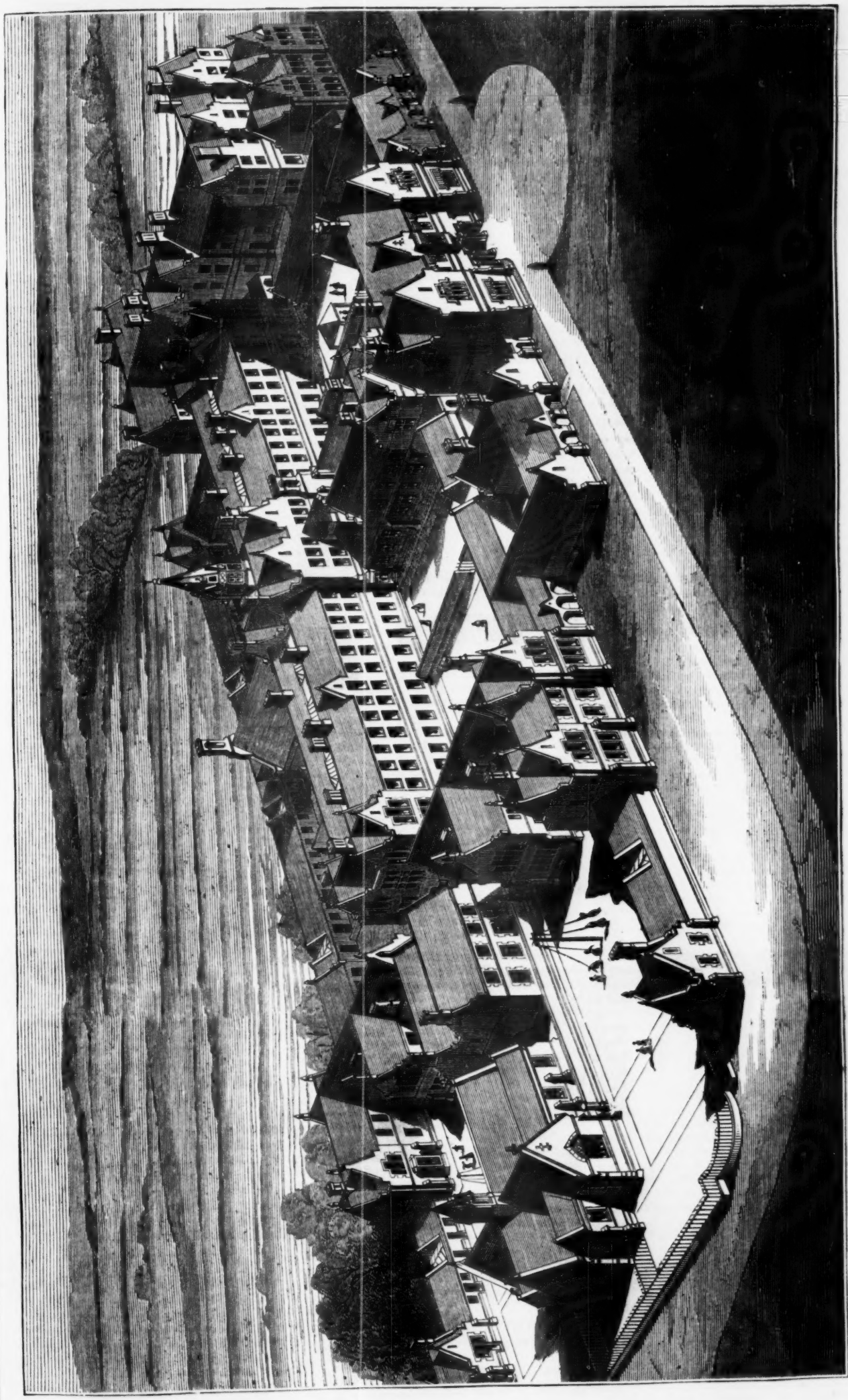
G Girl
H School
I Infants
K Probationary Children
L Infirm Women
M Infirm Men

N Disorderly Men
O Able Women
P Disorderly Women
Q Able Men
R Kitchen Court
S Adults' Dining-hall

T Stores, Domestic Offices, and Government Apartments
U Female Tramps
V Male Tramps
W Male Probationers

X Female Probationers
Y Court
Z Board-Offices
a Lying-in Ward
b Epileptic

c Sick
d Dirty
e Fever
f Epileptic
g Flour-mill



BIRMINGHAM NEW WORKHOUSE.—MR. J. J. BATEMAN, ARCHITECT.

ART-VERSES BY MICHELANGELO.

YOUR fragment of Goëthe's, on Transcendentalism in Art, brought to my mind something of a similar strain of thought, conveyed in two sonnets by one of the greatest masters, Michelangelo himself. The reader who remembers the saying of "the Great Michael" that *he had no other mistress but Art*, will not be surprised to find him addressing her in the tones of a lover.

LE BELLEZZE MONDANE SONO SCALA AL FATTORE.

Dimmi di grazia, amor, se gli occhi miei
Veggono il ver della beltà ch'io miro,
O s'io la ho dentro il cor; ch'ovunque io giro,
Veggio più bello il volto di costei.

Tu'l dei saper, poichè tu vien con lei
A tormi ogni mia pace, ond'io m'adiro:
Benchè nè meno un sol breve sospiro,
Nè meno ardente foco chiederei.

La beltà che tu vedi, è ben da quella;
Ma cresce poi ch'a miglior loco sale,
Se per gli occhi mortali all' alma corre.

Quivi si fa divina onesta e bella,
Come a se simil vuol cosa immortale,
Questa, e non quella, agli occhi tuoi precorre.

La forza d'un del volto, al ciel mi sprona
(Ch' altro in terra non è che mi diletti)
E vivo ascendo tra gli spirti eletti,
Grazia ch' ad nom mortal raro si dona.

Si ben col suo Fattore l'opra consuona,
Ch' a lui mi levo per divin concetti;
E quivi informo i pensier tutti e i detti,
Ardendo, amando per gentil persona.

Onde se mai da due begli occhi il guardo
Torcer non so, conosco in lor la luce
Che mi mostra la via ch'a Dio mi guide.

E se nel lume loro acceso io ardo,
Nel nobil foco mio dolce riluce
La giojia che nel cielo eterna ride.

EARTHLY CHARMS ARE STEPS TO OUR MAKER.

In pity tell me, love, if that mine eyes
See soothly all the beauty I admire,
Or if I hold it in my heart; a higher
And purer grace thus giving her I prize.

Thou ought'st to know, who'rt with her when she lies
In wait to rob my peace, my patience tire:
Albeit I would not cool that wasting fire,
Nor lose, oh love! the least of all my sighs.

The beauty which thou see'st is all her own,
But waxeth greater as it rises higher,
If, through the eye, it do the soul inspire;

So that what was but fair, divine hath grown
Even as immortal things their like require;—
This, and not that, it is thou dost admire.

The force of a fair face lifts me to heaven
(For on this earth none other I admire),
And I ascend among the heavenly quire,
A grace to mortal man but rarely given.

The work doth with its Maker chime so even,
That by divine conceits it lifts me nigher
To Him, and I a purer air respire,
By love made clean of every earthly leaven.

Whence I do know, if e'er from two sweet eyes
I cannot turn away, that in them lies
A light, to show the way to God and love;

And if I burn, enkindled by that light,
Oh then, from that sweet fire reflected bright
I see the eternal joy that laughs above.

M. MACD.

SMOKE NUISANCE.*

To ensure satisfactory operation, and the suppression of smoke, the extreme—not the nominal—power of the steam-engine should be taken as the datum: from this, by the accustomed formulæ, the boiler capacity should then be found, and, from the latter, the fire area; but form and disposition are of prime importance in the boiler; and the area of its heat-receiving surface, in fire-grate and flues, is understood, as regards its generative power, to be of more consequence than its cubical capacity. The parity of the former in square, to the latter in cubic, feet, is said to afford the most satisfactory results, economy included; while the areas of the fire-grate and flue surfaces are considered to be most efficient when proportioned to each other in the ratio of 1 to 18. Where this proportion of recipient surface does not exist, it should be brought about, as near as may be, by alteration.

With no air-supply excepting through the fire-grate, the great bulk of the gases arising from each fresh charge of fuel, with their accompaniment of uninflamed carbon, must necessarily escape through the flues, and issue in volumes of dark smoke from the chimney, unless, indeed, a greater degree of care in firing be exercised by the stoker than can be hoped for in common practice; and then, the continual firing at short intervals under such circumstances, to obviate the smoke, would be unattended with the desired economy; seeing that the lowering the temperature of the furnace, through the absorption of heat by the cold fuel, and by the hardly-intermittent current of cold air admitted through the door-opening, would have a retarding effect on the boiler, that would call for a greater consumption of fuel.

While putting together these remarks, we have had before us two pamphlets; one, "On the Construction of Boilers, Consumption of Fuel, and Prevention of Smoke," by William Fairbairn, C.E., F.R.S;* the other on "The City Smoke-prevention Act, with Suggestions on the use of Smoke-consuming Furnaces," by W. Keld Whytehead, C.E.;† to both of which we can refer the reader for scientific and practical instructions on these important subjects. To Mr. Fairbairn's admirable pamphlet we refer him for lucid information as to the gases eliminated by coal in a state of combustion, and the equivalents of atmospheric air requisite to support the same, as well as much valuable tabulated information as to the constituents and calorific powers of a great variety of coals. On the cylindrical boiler, with two furnaces and flues, the following extract will be of interest:—

"Irrespective of the changes of form and management of boilers which are in progress, it may be proper to notice a still further improvement in construction, which has recently taken place; and where a still greater economy is effected. This is a mean between the Cornish single-flue boiler and the tubular boiler: it is perfectly cylindrical, and contains two circular flues, varying from 2 ft. 6 in. to 2 ft. 9 in. diameter, extending throughout its whole length. * * * Towards the front end, the flues are made slightly elliptical, in order to receive the furnace grate-bars, hearth-plates, &c., to give sufficient space over the fire, and to admit a free current of air under the ash-pit. On this plan it will be observed that each furnace is surrounded by water in every direction, with large intermediate spaces to allow a free circulation of the water, as the globules of heat rise from the radiant surface over the fires, and the other intensely-heated parts of the flues. Another advantage is the position of the receptacle for the sedimentary deposits, which do not take place over the furnace, as in the old construction, but in the lower region of the boiler, where the temperature is lowest,—thus affording greater security from incrustation, and other causes of an injurious tendency."

In the boiler here described, the two furnaces are fed alternately; and the gases emitted flow along the flues, and only unite at its extreme end.

"At this point a change immediately takes place in the gaseous products, and that from one of two causes, as follows: Suppose the one furnace to be newly fired, and the fuel in it [not being] in a perfectly incandescent state, it then follows that the gases passing from the other furnace will not only be different in their constituents to those from the first, but they are at a much higher temperature; and both furnaces having received air as a constant quantity through the fixed apertures [under the bridges], it will be seen that, in the event of a surcharge of air on one side and a diminished supply on the other, that their extremes are neutralized by the excess of oxygen thus introduced, and the increased temperature which effects ignition at the point [at the extreme end of the boiler] where combination takes place. All that is therefore necessary is to replenish the fires alternately every twenty minutes, in order to effect the combustion of the gases without the least appearance of smoke. These, and the recipient surface, are the leading properties of this boiler, which, compared with others having single flues, is found to be greatly superior either as regards the combustion or the economy of fuel."

On this form of boiler Mr. Whytehead remarks (with some difference of opinion) as follows:—

"*Messrs. W. and J. Galloways' Patent Boilers.*—These boilers consist of a cylindrical shell or outer case, containing two cylindrical tubes forming the furnaces. These two tubes *unite behind the fire-bars* in a single chamber; and it is in this union that their virtue as smoke-consumers consists. The ordinary double-furnaced boilers in use in the manufacturing districts are defective smoke-consumers, inasmuch as the two furnace-tubes extend the whole length of the boiler; so that the products of combustion do not meet until their temperature has been reduced below the point of ignition. Extended experience proves that, as economic evaporators, Messrs. Galloways' boilers hold a high rank."

Mr. Whytehead's strictures on hand and machine firing will be found sound and practical: we quite concur in the importance attached, both by him and Mr. Fairbairn, to the duties of the stoker; and in the opinion that he should be paid, not according to the quantity of coals shovelled on the fire, but the amount of saving effected.

From Mr. Fairbairn's pamphlet we extract the following neat calculations, forming data for determining the sectional area of the flue,—quoted by him from a paper "On the Construction and proper Proportion of Boilers for the Generation of Steam," communicated to the Institution of Civil Engineers by Mr. Andrew Murray, of the Royal Dockyard, Woolwich:—

"Mr. Murray states that 'The quantity of air chemically required for the combustion of 1 lb. of coal has been shown to be 150·35 cubic feet, of which 44·64 enter into combination with the gases, and 105·71 with the solid portion of the coal. From the chemical changes which take place in the combination of hydrogen with oxygen, the bulk of the products is found to be to the bulk of the atmospheric air required to furnish the oxygen, as 10 is to 11. The amount is, therefore, 49·104. This is without taking into account the augmentation of the bulk due to the increase of the temperature. In the combination which takes place between the carbon and the oxygen, the resultant gases (carbonic acid gas and nitrogen gas) are of exactly the same bulk as the amount of air, that is, 105·71 cubic feet, exclusive, as before, of the augmentation of bulk from the increase of temperature. The total amount of the products of combustion in a cool state would, therefore, be 49·104 + 105·71 = 154·814 cubic feet.

The general temperature of a furnace has not been very satisfactorily ascertained, but it may be stated at about 1,000° Fahrenheit, and at this temperature the products of combustion would be increased, according to the laws of the expansion of aëriform bodies, to about three times their original bulk. The bulk, therefore, of the products of combustion which must pass off must be 154·814 × 3 = 464·442 cubic feet. At a velocity of 36 feet per second,* the area, to allow this quantity to pass off in an hour, is ·516 square inch. In a furnace in which 13 lbs. of coal are burnt upon a square foot of grate per hour, the area to every foot of grate would be ·516 × 13 = 6·708 square inches; and the proportion to each foot of grate, if the rate of combustion be higher or lower than 13 lbs., may be found in the same way.

This area having been obtained, on the supposition that no more air is admitted than the quantity chemically required, and that the combustion is complete and perfect in the furnace, it is evident that this area must be much increased in practice where we know these conditions are not fulfilled, but that a large surplus quantity of air is always admitted. A limit is thus found for the area over the bridge or the area of the flue immediately behind the furnace, below which it must not be decreased, or the due quantity could not pass off, and, consequently, the due quantity of air could not enter, and the combustion would be proportionally imperfect. It will be found advantageous in practice to make the area 2 square inches instead of ·516 square inch. The imperfection of the combustion in any furnace, when it is less than 1·5 square inch, will be rendered very apparent by the quantity of carbon which will rise unconsumed along with the hydrogen gas, and show itself in a dense black smoke on issuing from the chimney. This would give 26 square inches of area over the bridge to every square foot of grate in a furnace in which the rate of combustion is 13 lbs. of coal on each square foot per hour, and so on in proportion for any rate. Taking this area as the proportion for the products of combustion immediately on their leaving the furnace, it may be gradually reduced as it approaches the chimney, on account of the reduction in the temperature, and, consequently, in the

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* See page 52, *ante*.

* London: Simpkin, Marshall, and Co.; and John Weale. 1851.

† London: John Weale. 1851.

* See Dr. Ure's experiments, read before the Royal Society, June 1836.

bulk of the gases. Care must, however, be taken that the flues are nowhere so contracted, nor so constructed, as to cause, by awkward bends or in any other way, any obstruction to the draught, otherwise similar bad consequences will ensue.'

From this statement, says Mr. Fairbairn, it would appear that 26 square inches of area over the bridge is about the correct proportion for the combustion of 13 lbs. of coal per hour on each square foot of grate-bar. Now these proportions are rather more than are given in stationary boilers as the mean of a number of experiments, taken where the combustion was most perfect, gave about 18 square inches over the bridge, and about 28 square inches as the area of the flues to every square foot of grate-bar.

These data may not at first sight appear important: they are, however, of great value in practice, as the economy of the fuel and the efficiency of the furnace in a great measure depend upon the height of the bridge behind, which operates as a retarder of the currents, in the same way as the damper is used for checking the draught of the chimney in the flues."

In these pamphlets much information will be obtained respecting the principal smoke-consuming furnaces, which have from time to time been brought forward. Touching one of these, of great ingenuity and merit, we regret to know—and it is no secret—that its inventor and patentee, Juckes, is at present an inmate of the Queen's Bench, and for a very small amount as compared with the value of his invention.

In conclusion, we would caution the reader against the supposition that, because smoke may be prevented, therefore tall chimneys can be got rid of. Dr. Ure, in his evidence before a committee of the House of Commons, in August, 1843, intimated that the contrivances from Watt to the present time, which were directed to the burning of smoke, were grounded on a great error,—that while the result sought, and often attained, was the annihilation of smoke, it was attended with a greater evil, the creation of a far more noxious, though invisible, gas: he explained that, in the carbonic acid and smoke passing over the incandescent fuel, the former imbibed, and carried off, an additional portion of charcoal from the latter, and exchanged its proportion of 2 atoms of oxygen and 1 of charcoal, to equal portions of these gases, and thus became carbonic oxide, a gas of the most fatal description. The gases are still generated, and thrown off, notwithstanding that they are insensible to the eye.

ARTISTIC AND RAILWAY MEMS. IN IRELAND.

THE bridge over the river Luir, at present in course of construction at Caher, on the Waterford and Limerick Railway, is one of the largest yet constructed in Ireland. The remainder of the works on the line are steadily progressing under the superintendence of Mr. Wm. Dargan.

The directors of the Provincial Bank are about having a new bank erected at Maryborough.

A new church is about to be erected at Lisnaskea, according to the designs of the architect to the Ecclesiastical Commissioners: a large allotment of ground has been given by the Earl of Erne, with a subscription of 500*l.* towards defraying the expenses.

The Poor-Law Commissioners are erecting a new workhouse at Corrafin, county Clare, according to the drawings of their architect, Mr. Wilkinson. The works are now nearly complete. Messrs. Crowe and Sons, of Dublin, are the builders; and the expenditure will be about 6,000*l.*

The works at the new Roman Catholic church which is being erected at Rathmines, county Dublin, are progressing slowly. The old church is nearly enclosed by the new one, the walls of which are almost raised to the level of wall plate. The tetrastyle portico (originally intended) is not yet in course of erection. The front facing Rathmines-road is alone in chiselled granite stone, from the Wicklow quarries, the remaining exterior portion of the building being of rubble masonry, composed of *black* stone, *which forms a bad contrast.* Mr. P. Byrne is the architect.

The Midland Great Western Railway terminus, at Dublin, is now complete, with the exception of a few trifling finishings. The entire building is in chiselled granite stone, supplied by Mr. P. Ollagan, of Ballyknockin quarry. The expenditure incurred in erecting the directors' house and terminal buildings is about 23,000*l.* A massive retaining wall with curvilinear batter composed of rough hammered limestone, with granite capping serving as parapet for roadway, has been erected the entire extent of east elevation, which faces Phibsborough-road.

A model school is to be built at Louth, according to the designs of the architect to the Commissioners of National Education.

A submarine cable is to be established between Kingstown and Holyhead, and Mr. Jacob Brett has had an interview with the Lord-Lieutenant on the subject. Two wires are intended for Government and two for general and commercial purposes, and will be connected with those on the Midland Great Western and Great Southern and Western Railways, contracted for, we understand, at 200*l.* per mile.

A new church has been erected at Doe, county Donegal, by the Ecclesiastical Commissioners, in conformity with the designs of their architect: the interior woodworks, sittings, &c. are not yet complete.

A model school is about to be established by the corporation of Drogheda.

A new bridge, at a cost of 60,000*l.* is to be erected at Londonderry, 20,000*l.* are to be produced from the Londonderry and Enniskillen Railway Company.

Additions are being made to several of the large business houses in Dublin, but generally speaking the building trade is dull there.

BUILDERS' CHARGES FOR SURVEYING OR FOR ARCHITECTURAL DESIGNS.

SOME time ago, an action was brought in the Lambeth County Court, before Mr. G. Chilton, by Mr. Shaw, a baker, to recover 2*l.* 5s. for goods supplied to Mr. Eccles, a master builder of Brixton. The defendant pleaded the following set-off, verbatim:—

"1851, June 16.—To measuring and making A plan for A House, which I agreed to build for 90*l.*, attending on district-surveyor, &c., at 2½ per cent. on Cost of house 2*l.* 5s."

In answer to the questions of Mr. Bussell, solicitor for plaintiff, Mr. Shaw proved the claim; and with respect to the set-off, said that Eccles being a customer of his, he had employed him upon various building jobs; and upon requiring a new out-house he asked the defendant to come and look at it. He did so upon two occasions, on two Sunday mornings, and brought a bit of paper, upon which he made some pencil marks, with him. He never authorised him to act in the capacity of a surveyor or architect.

Mr. Eccles said he did not deny the plaintiff's claim for bread; and with regard to the above set-off Mr. Shaw requested him to give in an estimate for the building, and he did so for 90*l.* His contract was not accepted, and he accordingly charged 2*l.* 5s. for planning and measuring. Was in the habit of making such charges. Was not a surveyor or architect, but a builder at Brixton.

Mr. Bussell said the way in which the set-off was written, evidenced that Mr. Eccles was unqualified for the respectable and responsible calling of a surveyor or architect. It was an abuse upon the profession for persons like the defendant to assume a surveyor's calling. To show that Eccles was unqualified to even draw a plan, he would call Mr. Lett, the district-surveyor, into the witness-box. With respect to the other view of the set-off, it was quite clear that it was an afterthought, and that his client would never have heard of the defendant's absurd charge for surveying had it not been for the summons for bread owing.

Mr. Frederick Lett said he was the district surveyor; that on the 16th of June of last year, he was informed by the plaintiff he had applied to Eccles for an estimate for making a proposed addition to a house in Loughborough-road. At that time Eccles had not in any way defined in what way he purported making the addition for which 90*l.* was demanded. He was then instructed by Mr. Shaw to obtain tenders from several builders, giving Eccles an opportunity to tender. He did so, and having opened the tenders on the 6th of July, found the lowest to be Mr. Roycroft's (84*l.*), who contracted for and executed the works. Eccles declined to tender under him (Mr. Lett). His charge against Mr. Shaw, for detailed specification, drawing, superintendence of the works, and examining Roycroft's account, was 4*l.* 4s.

Mr. Eccles here said that he had demanded payment of Mr. Shaw for the work he had done, and, far from objecting to the demand, Mr. Shaw had agreed to it.

The Judge.—You hear what Mr. Eccles swears: is it so?

Mr. Shaw.—I swear that no demand was ever made upon me till now; and, on my oath, I never agreed to it.

Mr. Bussell.—It was clearly an afterthought.

The Judge.—It is perfectly clear Mr. Eccles has no right whatever to charge for the professional services of a surveyor: he admits he is a builder, and not a surveyor; therefore his charge for surveying is illegal. Still I consider he is entitled to some remuneration for the labour and time bestowed. I shall therefore award him 1*l.*, which will be a verdict for plaintiff of 1*l.* 5s.

BURTON *v.* DOWDEN.—This was an action brought in the Marylebone County Court, to recover 3*l.* 3s. for services rendered in the capacity of an architect. The plaintiff deposed to being engaged by the defendant to prepare plans for his premises. He did so, and expected to have had the contract for the work in question: he did not get it. Mr. Alderman Lawrence did, because it was thought he had more influence with the district surveyor.

Defendant said he had not had any of the drawings. Mr. Burton proposed an iron column, which he, defendant, had a great objection to; and as the plaintiff said the building could not be securely constructed without the column, he applied to Mr. Alderman Lawrence, who said it could be erected without the obnoxious supporter, and he gave him the job, and for no other reason.

The judge said he had so frequently adjudicated upon similar suits, that he had no hesitation in giving a verdict for the defendant.

THE FOUNDATIONS OF BRIDGES.

THE BRIDGES OF THE THAMES.

THE failure of Westminster and Blackfriars bridges has been the heading to, or the subject of, numerous articles in the papers; and questions similar to that asked in THE BUILDER of the 17th (viz., if the removal of old London-bridge has caused the failure of these, why have not the Southwark and Waterloo bridges shared the same fate?), are constantly being put: will you permit me to answer, and I will endeavour to do so in a manner that will prevent your being troubled with such questions for the future.

There are two simple requisites to make a foundation in the bed of a river like the Thames secure.

1stly. The area must be sufficiently great to resist the pressure of the superimposed structure.

2ndly. This area must be obtained at such a depth beneath the river bed, not only that a sufficiently resistant stratum may be reached; but that it may be left undisturbed, should the bed of the river be lowered by artificial or by natural means. The tonnage of the vessels navigating the river may be required to be increased, and the depth of water, therefore, increased by dredging. Obstructions to the ebb and flow of the tide may be removed, and the greater velocity thus allowed to the water scour away the bottom. The determination of this proper depth for the foundation must be confided to the judgment of a practised engineer, and there are three modes by which, in modern practice, he may reach it. 1stly. By timber piling within a cofferdam, as in Waterloo, Southwark, and all the other bridges over the Thames except Westminster and Blackfriars. 2ndly. By excavating down to the proper stratum within a cofferdam, as in the Potomac aqueduct. 3rdly. By sinking permanent cofferdams, in the shape of large iron cylinders, as at Rochester. In 1738, when Labelye designed Westminster-bridge, none of the above methods of founding piers were known, and caissons were used which were water-tight chests sunk upon the bed of the river, previously dredged level to receive them, and on the bottom of these chests the masonry of the piers was erected. In 1760, Milne commenced Blackfriars-bridge, and the same mode of getting in the foundations was adopted, but before sink-

ing the caissons the area to be occupied by them was partially piled, and the heads cut off below the water, at the proper level of the river bed: these piles were more for insuring an even bearing for the caisson, than to take any burden, and the result has sufficiently proved this to be the case. This method of founding by caissons was a great advance over the old one, by "starlings," as those huge bulwarks of timber filled with loose stones were called; and Rochester-bridge is the only example of such rude work remaining in England.

In 1811 Mr. Rennie commenced Waterloo-bridge, and introduced coffer-dams, by which the area of the foundations could be laid bare, and the river bed rendered, by close piling, sufficiently solid to support the superimposed mass, *for a great depth beneath the bed*, which is the important feature that has enabled this and the other bridges with similar foundations to remain unaffected by the scouring away of the bed around them.

The stability of a pier founded on a caisson grating depends upon the area exposed to the pressure remaining undisturbed. The gratings at Westminster were laid about 5 feet below the bed of the river, and so long as the scour affected only the bed *above* the level of the grating, the bridge stood secure; but the scour through the arch which has yielded, and is now, with its immediate neighbours, supported upon centreing, has undermined the gratings beneath its piers, which have consequently canted inwards, and allowed the arch to spread.

The case is precisely the same with Blackfriars. Piers supported upon an efficiently piled area have their foundations, not upon the *heads* of the piles, but upon the *ends*, which most probably will be 20 feet below the bed of the river: the area supporting the pier is therefore 20 feet thick. This system of piling is protected by sheet piling, encasing it like a box, which preserves all the inner parts; and a disturbance by scour may take place to a considerable depth below the mere masonry of the pier, without evil consequences resulting. This denudation is not, of course, a desirable thing, but the amount that would be fatal to a pier founded on a caisson grating without piles would be harmless to one founded as those of Waterloo and Southwark bridges are.

These, then, Sir, are the facts of the case, and I think sufficiently answer the question, why have Westminster and Blackfriars bridges given away, while Waterloo and Southwark remain firm? S. C.

FOREIGN ARCHITECTURAL AND ARTISTICAL INTELLIGENCE.

Emolument and Honour conferred on Science and Art Men.—M. Leverrier, who (contemporaneously with Mr. Adams) discovered the *existence* of the planet Neptune by mathematical calculation, has been named a member of the senate of the French Republic.—The King of Prussia has conferred the decoration of the Order of Merit (a sort of Legion of Honour) on Professor Owen, the English comparative anatomist; M. Gaillard, the painter, of Brussels; and M. Tenerani, the sculptor at Rome. The same monarch has forwarded to the French painter, M. Ingres, a large gold medal, for having presented the king with a copy of the engravings lately published of M. Ingres's pictures.—M. Baumgärtner, formerly the editor of a physico-mathematical journal, has been appointed Minister of Finance and Public Works by the Emperor of Austria.

Berlin.—The electro-telegraphic lines for connecting the different police-stations of the Prussian capital with those of the fire brigade, have now been completed. By these means any accident of the kind becomes instantaneously known to the firemen, and although the expense has been, at first, considerable, the amount will be saved in property and premiums of the insurance offices. Accidents of any kind, robberies of some magnitude, &c., will become similarly known to the police authorities, for which purpose a small apparatus has been put up in the *bureau* of the chief of the Berlin police.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

THIS society held its first meeting after the Christmas recess, on Wednesday evening, January 28th. A considerable number of valuable works were presented to the association from various learned societies and private individuals. A Roman urn was exhibited by Mr. Tucker, and a singularly rowelled spur of the 15th century, by Mr. Cavanagh, of Wexford, Ireland. Mr. Burkett sent a drawing of the remains of the ecclesiastic lately discovered in the Crypt of St. Stephen's chapel, Westminster, and a most interesting discussion took place on the subject. A letter from Mr. Duesbury correcting some serious errors in the hitherto published accounts of the crypt was read, and that gentleman, who was present, added to the information contained in his letter, some important as well as interesting facts respecting the original construction and appearance of that beautiful building. Mr. Carrington exhibited several very careful rubbings of brasses in Wantage and Langbourne churches, Berks, and St. Michael's, Penkeril (near Falmouth), Cornwall. Mr. Colnaghi exhibited some beautiful specimens of tapestry, one of them decorated with imitation jewellery. Mr. Planché read a paper on the Monuments of the Cockayne family, in Ashburne church, Derbyshire; and it was announced from the chair that the next congress would be held at Newark, under the presidency of his Grace the Duke of Newcastle.

GAS.

Ely.—The gas inspectors of Ely Trinity have been superseded by the local Board of Health, who have now taken charge of the lighting of the town.

Southampton.—The local Board of Health here also are taking an active part in the extension of gas lighting. They have reduced the long-standing debt of the town to the local gas company by 2,000*l.*, and the company have since announced a reduction of price to 5*s.* a thousand cubic feet, from Michaelmas last.

Newport.—The town has been planted with ornamental gas lamps, and the new gas company have lit the High-street.

Cambridge.—An active canvass is now in progress through this city for subscribers to the proposed new gas company. The price is to be 4*s.* a thousand cubic feet, and the list of subscribers guaranteeing that they will patronise the new company is already a large one, according to the *Cambridge Chronicle*.

Bilston.—At the annual meeting of the Bilston Gas Company a dividend at the rate of 8 per cent. on the paid-up capital was lately announced, with a surplus of 53*l.* added to the reserve fund. The sum total of profit on this small concern was only 1,253*l.* odd.

Preston.—The result of previous reduction in the price of gas here has been such that the directors, in their annual report, announce that they "feel justified in again reducing the price, so that on all bills made out after the 1st of March next, the net cash price will be 4*s.* 6*d.* per thousand to the small consumers, and 3*s.* 9*d.* to the largest." It was resolved at the annual meeting, "That a dividend of 1*l.* per share, net, out of the profits of the half-year ending 31st December, 1851, be now declared, payable by the treasurer on the 2nd February next;" and, "That the salaries of the auditors be increased 30*l.* each per annum."

London.—"Unlike some gas companies," says the *Journal of Gas Lighting* "the Chartered has repudiated the system of maintaining their accustomed dividends, in the face of the late reduction of price, by resorting to the supply of an inferior article; and, as it is now the only free and unfettered gas company in the city of London, they are on the eve of profiting largely by the position they have in this respect assumed. Let us hope that the same wise policy will be pursued under the presidency of the new governor, Benjamin Hawes, Esq." It is by increased purity alone, and hence by extension in private dwellings, not by defilement or adulteration, that the dividends are to be increased, and they will be so, on these conditions, to an extent that may astonish the shareholders as well as the management.—The Imperial Gaslight and Coke Company have given notice that the price of their gas, by meter, will be reduced to 4*s.* 6*d.* per 1,000 cubic feet, dating from 1st January instant, and that the charge, by scale, for the 15-hole Argand burner, to burn from sunset to 9 o'clock, six days in the week, will be at the rate of 2*l.* 2*s.* per annum; and other burners in proportion.

Prismatic Refractors for Burners.—Mr. Boggett has recently patented an application of optical science to gas-lights, whereby they are said to be greatly increased in brilliancy, without additional expenditure of gas. It consists simply in placing a long prismatic lens on each side of an Argand burner, by which the appearance of three perfect flames of equal power is produced. These lenses may be applied to any description of burner, but the patentee of course prefers his own burner, with lateral jet-holes, patented in 1850, and now known as "the smokeless burner."

Books.

General Board of Health: Minutes of information *collected on the practical Application of Sewer Water and Town Manures to Agricultural Production. Ordered to be printed for the Use of Local Boards of Health and their Surveyors, &c., December*, 1851. Her Majesty's Stationery Office. 1852.

To the satisfactory solution of the difficult, and as yet unsettled question of the disposal of the refuse and sewage of towns with the least offence and injury, and the most advantage, to the community at large, there are two essential aspects of the subject which must necessarily be well considered, namely, as it relates to the sanitary state of towns, and even of agricultural districts, and as it relates to the cultivation and improvement of the soil in the latter districts, and especially in those more immediately surrounding towns. The paper under notice, together with its appendices, constitutes a valuable and interesting contribution of the most recent and approved experience and suggestion as to both of these vital questions. The minutes are drawn up by Mr. Henry Austin, the secretary to the General Board of Health, and amongst the appendices are other valuable reports and papers, tables, and suggestions on various points bearing on the general question.

Stated broadly, the result now arrived at appears to be that on the whole, and notwithstanding the errors of the Metropolitan Sewage Manure Company, a distribution of liquid manure through tubular mains and branch pipes to adjoining horticultural and agricultural districts, with hydrants and hose-pipes in the fields, would be the best way of disposing of the sewage of towns; but that where, or when, such a system could not be continuously in operation, the sewage might be solidified on Prince Albert's principle of upward filtration, through tanks with false bottoms, as in the filtration of Thames water for town use, and with whatever filtering medium, such as charcoal, gypsum, burnt clay, &c., as suggested by the Prince, or otherwise, may be selected as best adapted to the circumstances. This principle of filtration, as we have before remarked, and as appears to have been considered in the original suggestion, is equally applicable to the separation of liquid manure itself in a fit state for distribution to fields, a filtering medium simply separating the solid refuse being substituted for one absorbing the valuable materials in solution.

The pamphlet not only contains matter of vital import as relates to towns and their suburban districts, but also to farmers and agriculturists in general, every farmyard supplying to the rural farm what every town does to its own surrounding market gardens; so that whether by mere gravitation or by steam or hydraulic power, every farm might be organised with an *arterial* watering and manuring system as well as with a *venous*

draining one; and, indeed, might not the one be associated with the other, like the impulsion and distribution of arterial blood and the suction and withdrawal of the venous mainly by the one common central agency of the heart? Drainage is, no doubt, of vast importance to the soil, not only clearing it of sour and stagnant moisture, but wonderfully mitigating the coldness, or rather positively and obviously increasing the warmth, both of soil and air; but what an immense power of multiplying produce would be realised by the *addition* of a concurrent tubular system of arteries for the distribution of liquid manure when wanted, and of pure water in drought! Such, it appears, is the system, in its full development, of which our agricultural engineers and our active Central Board of Health are laying the foundations; and we certainly think that a pamphlet such as this ought to be not only in the hands of every local Board of Health, but of every farmer and every market-gardener in the country, as one of the most important contributions towards an end which, together with the application of steam or other power to ploughing, digging, harrowing, &c., is likely one day to realise that era of which we some time since spoke, in which the science and the practice of agriculture will be as vastly developed as have the science and the practice of *other* MANUFACTURES in the memory of the present generation.

Another small contribution towards the same great end, we may here briefly notice, namely, a clearly written pamphlet on the drainage of Coventry, with proposals for the establishment of a self-sustaining system of sewage removal, by Mr. T. A. Yarrow, C.E., Engineer to the Irish Amelioration Society. Mr. Yarrow, too, advises the adoption of Prince Albert's filtering tanks, together with peat-charcoal for the solidification and deodorization of the sewage.

Miscellanea.

THE BUILDERS' BALL.—We hope our readers will keep in mind that the ball, in aid of the Builders' Benevolent Institution, is to come off on the 19th February. The list of stewards is not yet what we wish it were; but no doubt it will be greatly enlarged now that the time is so close at hand. The position of a steward is much more honorary than expensive, and we trust that, for the sake of so excellent a charity, even those who would have rather had some other mode of benefiting it than the one found to be expedient in the present instance, will not object to contribute the means at least, though they cannot enjoy the opportunity.

ENGINEER FOR METROPOLITAN SEWERS COMMISSION.—It has been suggested, and, as it seems to us, with good reason, that the resignation of Mr. F. Foster, as engineer-in-chief to the Court of Sewers, affords an opportunity for rewarding that individual among the competitors of 1849, whose design approaches most nearly that which has been sanctioned by the court, or is, otherwise, the best.

COTTAGE COMPETITIONS.—The report of the committee of the Highland and Agricultural Society of Scotland on cottage competitions during 1851, states "that in the county of Berwick no fewer than ten parishes had competed with great spirit and benefit to the cottagers. Many proprietors had built excellent cottages, or improved the old ones, so that no part of Scotland is now superior to this district in cottage accommodation. Fresh districts should annually be added to the list, and the benefit resulting from competition be felt throughout the whole country." While the committee lament the little interest generally taken in cottage competitions, they notice the zeal of many proprietors in building and improving cottages. Mr. Home, of Wedderburn, had built thirty-one cottages, and improved ten existing cottages. Lord Kinnaird had built twenty and improved five, and Sir David Kinlock had built eight. Judging from the plans received, all these cottages appeared to be much superior to the majority of such buildings in general use.

SALES OF HOUSES, &c.—At Messrs. Farebrother, Clark, and Lye's sales, at Garraway's, on Wednesday in last week, the important freehold ground-rents issuing out of the Lyceum Theatre, two dwelling-houses, Nos. 1 and 2, Wellington-street North, and three houses in Exeter-street, Strand, amounting together to 70*l.* per annum, and of the estimated annual value of 3,000*l.*, were sold for 15,750*l.* Two tithe-free farms, situate in the parish of Langford, near to Farringdon, Berks, held under leases for lives, containing 178 acres, and let at 320*l.* per annum, were sold for 3,100*l.* A leasehold private residence, No. 23 A, Bruton-street, Berkeley-square, held for a term of 49 years, at a ground-rent of 55*l.* per annum, sold for 2,030*l.* An improved rent of 30*l.* per annum, for thirteen years, issuing out of a residence situate at Kennington-common, sold for 200*l.*; and a freehold house and shop, No. 112, Fleet-street, let on lease at 112*l.* per annum, was knocked down for 2,050*l.*—*Morning Herald.*

WYLD'S GREAT GLOBE.—Sir,—My retirement, twelve months ago, as architect of the building for the great globe in Leicester-square, having had an injurious implication on my professional character, which I have had no opportunity of explaining, will you allow me now, in my own justification, to state, that the plans, &c., showing the mode in which I proposed constructing the building, and on which Mr. Myers's contract at 1,888*l.* were founded, had been carefully examined by the official referees, and pronounced satisfactory by them, and that Mr. Wyld had received the same favourable opinion from one of the principal builders in London. It is due to Mr. Wyld that I should further state, that after giving my evidence in the late trial of *Abrahams* v. *Wyld* (as Mr. Abrahams' witness), Mr. Wyld made me an apology in court for the manner in which I had been treated in this business.—EDWARD WELCH.

OMNIBUS PROPRIETORS AND SERVANTS.—It is stated, says the *Morning Herald*, that some disagreeable differences are likely to arise between the omnibus proprietors and their men, in consequence of the movement which the latter have made to obtain cessation from labour on every alternate Sunday. The drivers and conductors have recently formed a benevolent institution, for the purpose of providing against sickness and other unavoidable misfortunes. This society has taken part in the above movement, and it is said that several of the members have, in consequence, received notice of discharge from their employment. If this determination be acted upon, the probability is that some serious "opposition," in the shape of competing omnibuses, will be started by the men. The poor omnibus drivers and conductors are much to be pitied. *They* have, indeed, too much reason, we think, to complain of "over-time." No "galley-slave" was ever so "lashed to the oar" as they are to their duties. There ought to be two distinct sets of men for each omnibus, were it possible to make such an arrangement, consistently with the interests of the men as well as of the masters. The public interests themselves demand it. Such an arrangement would do more than any thing else to put an end to fretting and chafing with omnibus men. All they themselves ask, however, is liberty every alternate Sunday, but even that necessitates a double set of men, at least for the time required.

THE TIMBER TRADE.—It having been represented to the Customs authorities, by the importers of wood goods at the port of London, that difficulties are experienced with respect to planks, deals, battens, &c., entered by tale upon a computation of their cubic content, calculated according to the scale annexed to the Act 14th and 15th Vict. cap. 62, in consequence of the length of the pieces in the scale being particularised by feet, without an allowance of any fractional part thereof; and also, in consequence of the importers not being in possession of the exact dimensions; the authorities have issued a general order to their officers at all the ports throughout the kingdom, directing certain regulations in the matter to be in future observed.

PROPOSED GREAT EXHIBITION IN NEW YORK.—The committee on the petition asking that Edward Riddle may be permitted to erect on Madison-square, New York, a building of iron and glass, 600 feet long and 200 wide, for an industrial exhibition of all nations, *have reported favourably to the City Board of Aldermen*, and a resolution, granting him the sole occupation of the square for two years, has been passed. The occupiers of the land are to inclose it with an iron fence, to cost not less than 6,000 dollars, and they all agree that the admission price to said enclosure shall at no time exceed fifty cents.

RAILWAY COMPANIES AND LUGGAGE.—At the Marylebone County Court lately, a lady brought an action against the Great Western Railway Company for 35*l.* 14s. 3d. being the value of some luggage lost at the station. It appeared by the statement of an omnibus conductor, named Long, who was brought up on a *habeas corpus* expressly to state the manner in which the luggage was stolen, that it was customary, on the arrival of trains, for the porter to bring out the passengers' luggage, and that any omnibus conductor might get hold of it and drive off. The company contended that they were not liable, as it was expressly stated in their bye-laws that every first-class passenger would be allowed 112 lbs. and every second-class passenger 56 lbs. free of charge, but that the company would not be responsible for luggage unless booked and paid for. The plaintiff in this case had not complied with this bye-law. In support of the plaintiff's case Mr. Goodman stated that, in order to test the "bye-law," he had applied to the station clerk to book his luggage, and this had been refused. Mr. Amos (the judge) said it would be a most *extraordinary thing if the company could enforce such a law as this, made by themselves*, and compel passengers to book their luggage to ensure the responsibility of the company. A verdict was at once given in favour of the plaintiff for the whole amount, 35*l.* 14s. 3d.

ELECTRO-TELEGRAPHIC PROGRESS.—The system adopted in Prussia of running the gutta perchaed wires underground has proved, as we long since predicted, so complete a failure, that the directors of the Royal Prussian Telegraph have resolved to substitute the usual mode of fixing them on posts. The gutta percha was constantly eaten away by vermin. The wires, however, might have been protected by tubes. The directors have ordered tenders to be taken in the English markets for a considerable supply of wire for their telegraphs.——The various states of Switzerland have subscribed 225,912f. as a loan, without interest, for the construction of electric telegraphs. The sum required is 500,000f.

LECTURES TO WORKING MEN.—We are glad to hear that a series of lectures illustrative of the collections in the Museum of Practical Geology, is about to be given for behoof of artizans, who will be admitted by free tickets, for which early application ought to be made, as the number of admissions will necessarily be limited. The first lecture will be delivered on Monday, the 9th of February, by Dr. Lyon Playfair, on glass and its composition, and the series will be continued by other lectures on each of five successive Mondays, at eight o'clock in the evening.

IMPROVEMENT OF DWELLINGS.—A society called The Windsor Royal Society for Encouraging and Providing better Domestic Accommodation for the Industrial Classes, has been set on foot at a meeting held in the Townhall, Windsor, on Thursday in last week. The society is to have a capital of 6,000*l.* in 600 shares of 10*l.* each, and will be under the patronage of her Majesty and Prince Albert. The Prince intends, as he cannot participate in any profits, to purchase shares to the amount of 200*l.* and present them to the society.

ST. PAUL'S, COVENT-GARDEN.—Efforts are being made to obtain for this church of historical interest funds for some stained glass windows. There will surely be little difficulty in effecting this in such a parish as St. Paul's, Covent-garden.

CONDENSATION OF MOISTURE IN SHOP WINDOWS. — A correspondent, M. A. D., appears to have tried our suggestion to use some deliquescent, and we presume has found it successful; for he says, with reference to our request to be informed of the result of any such trial—"In answer to the request headed 'Condensation on Glass,' in No. 465, vol. x.: Well mix three pounds of potash with one pound of common salt. Spread it well, or dissolve it in as small a quantity of boiling water as you can: soak it all up with dry cloths, and spread them near the glass."

ARCHITECTURAL INSTITUTE OF SCOTLAND.—The Architectural Institute of Scotland met on Thursday evening, the 22nd instant, at Aberdeen. Mr. Alexander Forbes Irvine, younger of Drum, was called to the chair, and supported by the Lord Provost and Sir A. L. Hay. After an address by the chairman, a paper was read by Mr. Thomas Purdie, of Edinburgh, giving "a comparative estimate of mural decorations, as practised in our country, and on the continent of Europe, accompanied by suggestions as to the methods by which professional architects may improve this department of native art."

CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.—The next annual meeting of the Cambrian Archæological Association is, according to the Cardiff *Guardian*, to be held at Ludlow, in the autumn, under the presidency of the Hon. R. H. Clive, M.P., of Oakley Park, who has succeeded Earl Cawdor. As the neighbourhood of Ludlow abounds in objects of antiquarian interest, more so, perhaps, than any other part of the marches which are comprised in the society's researches, a very large assembly is anticipated.

DISTRICT SURVEYORSHIP.—By the lamented death of Mr. W. Grellier, the district surveyorship of St. Mary's, Whitechapel, is vacant.

TENDERS

For Parsonage at Staplefield, Sussex, for Rev. R. Wilson. Messrs. Morris and Hebson, architects. Quantities supplied:—

J. Hodge	£1,989	0	0
H. Constable, Penshurst	1,877	18	9½
J. Arnall	1,876	17	3½
Holloway	1,814	0	0
Ockenden	1,813	5	8
W. Smith, London	1,704	0	0
Thomas Fisher, Stratford	1,660	0	0
Pollock and M'Lennan, London	1,580	0	0

For New Workhouse for Westminster, to be built at Kensington. Messrs. Hunt and Stephenson, architects:—

Tompson	£32,745	0	0
Hurst	30,899	0	0
Cooper	29,886	0	0
Mansfield	28,433	0	0
Glenn	27,923	0	0
Hayward and Nixon	27,900	0	0
Lee	27,872	0	0
Kelk	27,864	0	0
Lucas	27,208	0	0
Smith and Appleford	26,965	0	0
Piper	26,482	0	0
Little and Sons	26,443	0	0
Holland	2,6380	0	0
Sissons and Robinson	25,900	0	0
Hill	25,290	0	0
Locke and Nesham	25,157	0	0
Pollock	24,229	0	0
Jay	23,517	0	0
Myers	22,374	0	0

For the Cambridge Military Asylum, to be erected at Kingston. Mr. Allom, architect:—

Mason (Kingston)	£4,389	0	0
Holland	4,340	0	0
Lucas	4,100	0	0
Dove	4,060	0	0
Haynes	4,040	0	0
Jay	3,979	0	0
Patman (Kingston)	3,970	0	0
Ashby and Horner	3,840	0	0
Grimsdell	3,834	0	0
Myers	3,766	0	0
Carter and Ellis	3,756	0	0
Locke and Nesham	3,700	0	0

TO CORRESPONDENTS.

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